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NATIONAL TECHNICAL INFORMATION SERVICE

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GOVERNMENT REPORTS

Announcements & Index

Volume 82, Number 24 November 19, 1982

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* Committee on Scientific and Technical Information

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Subcategories: Atmospheric Physics; Meteorology.

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REPORTS ANNOUNCEMENTS

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SAMPLE ENTRY

Field 12—MATHEMATICAL SCIENCES
Group 12A—Mathematics and Statistics
PB80-104045 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Constructed Facilities Div.
Computation of Hankel Transforms Using the Fast-Fourier Transform Algorithm,
E. Kausel, and G. Bouckovalas. Aug 79, 49p
R79-12, NSF/RA-79-12, NSF/RA-790206
Grant NSF-ENV77-18339

An efficient numerical procedure is presented for the computation of Hankel Transforms. The algorithm is based on the expression of the Hankel Transform in terms of a two-dimensional Fourier Transform, which is then reduced to only one dimension. The latter is then evaluated with the Fast Fourier Transform algorithm. Examples are presented, and a listing of the computer program included.

NTIS Subject Category
NTIS Subcategory
NTIS order number Availability/Price codes
Corporate or Performing Organization

Report title

Personal authors Report date Page count
Report number(s)
Contract or grant number(s)

Abstract

1. AERONAUTICS

1A. Aerodynamics

AD-A117 859/9 PC **A03**/MF **A01**
Cambridge Univ. (England). Cavendish Lab.
Reduction of Aerodynamic Drag: Torsion Disc Viscometry.
Interim rept. May-Dec 81,
W. A. Wilby, and J. E. Field. Jan 82, 37p AFOSR-TR-82-0619
Grant AFOSR-79-0057

This report describes the design, construction and evaluation of a working torsion disc viscometer. Initial tests at gas pressures between 9.1 mbar and 1000 mbar show that the theory of the instrument is adequate and that the viscometer is capable of detecting small changes in gas viscosity. A thorough investigvation of the effect of radioactive irradiation on gas viscosity will be made shortly, following the work of Kestin and sHah. An analysis of their approach is given here, viewed in the light of our preliminary work, and suggests the most likely ways of achieving a change in gas viscosity. (Author)

AD-A117 906/8 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Ocean Engineering.
Analysis of Small-Aspect-Ratio Lifting Surfaces in Ground Effect,
J. Nicholas Newman. 31 Mar 81, 11p
Contract N00014-78-C-0365
Jnl. of Fluid Mechanics, v117 p305-314 1982.

No abstract available.

N82-27215/4 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
Finite Difference Methods for the Solution of Unsteady Potential Flows.
F. X. Caradonna. Jun 82, 36p NASA-TM-84248, NAS 1.15:84248
Prepared in Cooperation with Army Aviation Research and Development Command.

Various problems which are confronted in the development of an unsteady finite difference potential code are reviewed mainly in the context of what is done for a typical small disturbance and full potential method. The issues discussed include choice of equations, linearization and conservation, differencing schemes, and algorithm development. A number of applications, including unsteady three dimensional rotor calculations, are demonstrated.

N82-27222/0 PC **A04**/MF **A01**
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
Three-Dimensional Flows About Simple Components at Angle of Attack.
D. J. Peake, and M. Tobak. Mar 82, 59p A-8859, NAS1.15:84226, NASA-TM-84226
Presented at the AGARD Lecture Series No. 121 on High Angle of Attack Aerodyn., Hampton, VA., 10-11 Mar. 1982.

The structures of three dimensional separated flow about some chosen aerodynamic components at angle of attack are synthesized, holding strictly to the notion that streamlines in the external flow (viscous plus inviscid) and skin friction lines on the body surface may be considered as trajectories having properties consistent with those of continuous vector fields. Singular points in the fields are of limited number and are classified as simple nodes and saddles. Analogous flow structures at high angles of attack about blunt and pointed bodies, straight and swept wings, etc., are discussed, highlighting the formation of spiral nodes (foci) in the pattern of the skin friction lines. How local and global three dimensional separation lines originate and form is addressed, and the characteristics of both symmetric and asymmetric leeward wakes are described.

N82-27223/8 PC **A04**/MF **A01**
Old Dominion Univ., Norfolk, VA. Dept. of Mechanical Engineering and Mechanics.
Development of a Nonlinear Vortex Method.
Progress Report, 1 Oct. 1981 - 31 Mar. 1982.
O. A. Kandil. Jun 82, 69p NASA-CR-169092, NAS 1.26:169092
Grant NSG-1560

Steady and unsteady Nonliner Hybrid Vortex (NHV) method, for low aspect ratio wings at large angles of attack, is developed. The method uses vortex panels with first-order vorticity distribution (equivalent to second-order doublet distribution) to calculate the induced velocity in the near field using closed form expressions. In the far field, the distributed vorticity is reduced to concentrated vortex lines and the simpler Biot-Savart's law is employed. The method is applied to rectangular wings in steady and unsteady flows without any restriction on the order of magnitude of the disturbances in the flow field. The numerical results show that the method accurately predicts the distributed aerodynamic loads and that it is of acceptable computational efficiency.

N82-27232/9 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Agard Three-Dimensional Aeroelastic Configurations.
S. R. Bland. Mar 82, 17p NASA-TM-84708, NAS 1.15:84708
Prepared in Cooperation with AGARD, Neuilly-sur-Seine, France.

The calculation of unsteady aerodynamic forces in the critical transonic speed regime is investigated. The development of such methods is be enhanced by the availability of a limited number of test cases for the comparison of competing methods. Test cases for five clean, isolated wings are presented. Wing geometric descriptions, airfoil coordinates, and suggested aerodynamic conditions for each are included.

1B. Aeronautics

AD-A117 397/0 PC **A02**/MF **A01**
Army Research and Technology Labs., Hampton, VA. Structures Lab.
The Aerodynamic Influences of Rotor Blade Taper, Twist, Airfoils and Solidity on Hover and Forward Flight Performance.
Conference paper,
Gene J. Bingham. 18 Jun 82, 14p
Paper from the Proceedings of the Army Sciences Conference (1982), 15-18 Jun 82.

The study began with the design of an advanced rotor for the UH-1 helicopter. The initial design goal was to reduce hover power required by 8% without degrading forward flight performance. This reduction was to be accomplished with an aircraft gross weight of 8050 pounds while operating at an altitude of 4000 feet and a temperature of 95 deg F. The study indicated that the design goal could be exceeded. Based on this result, models of the baseline and advanced blade have been evaluated in the Langley V/STOL wind tunnel and the analytical study has been extended to other helicopter configurations within the US Army inventory. This paper is to describe the design philosophy applied. The influence of blade planform and twist on rotor performance are considered first for hover and then for forward flight. These influences initially are made independent of airfoil characteristics; after the influences of blade geometry are described, the airfoil requirements are addressed.

AD-A117 445/7 PC **A03**/MF **A01**
Federal Aviation Administration Technical Center, Atlantic City, NJ.
Northeast Corridor Helicopter Area Navigation Accuracy Evaluation.
Data rept. Jul 79-Apr 80,
Jack D. Edmonds. Jun 82, 36p Rept no. DOT/FAA/CT-82/57

This report presents area reduced navigation accuracy test flight data collected along an experimental area naviation route structure - the so-called Northeast Corridor. This corridor is an experimental helicopter airway structure extending between Washington, D.C., and Boston, Mass. It contains of 2 one-way, reduced width (4 nautical miles (nmi)) airways including one route spur from Allentown, Pa. These flight tests were a joint effort of the Federal Aviation Administration and the Helicopter Association International (HAI). The objective was to determine if the NEC could be navigated within the 4-nmi airway boundary at the 95 percent confidence level required by Advisory Circular (AC) 90-45A, "Approval of Area Navigation Systems for Use in the U.S. National Airspace System."

AD-A117 552/0 PC **A04**/MF **A01**
Rockwell International, Los Angeles, CA. Los Angeles Aircraft Div.
Investigation of Aircrew Protection During Emergency Escape at Dynamic Pressures up to 1600 Q.
Final rept. 19 May 80-22 Feb 81,
Robert J. Cummings. May 82, 72p NA-80-871, AFAMRL-TR-81-71
Contract F33615-80-C-0513

A perspective is developed on requirements for applied biomechanical research necessary to support development of new advanced escape capability for negative static stability margin aircraft. Processes which govern potentially injurious energy transfers to and from the ejectee are enumerated. Four escape design approaches are evaluated in terms of energy transfers, protection strategies, and research requirements, including: (1) advanced open upright seat, (2) reclined open, (3) partially encapulated, and (4) encapsulated. (Author)

AD-A117 780/7 PC **A02**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
A Tower Approach to Slant Visual Range Observation and Prediction,
Edward B. Geisler, and Donald A. Chisholm. 1981, 6p Rept no. AFGL-TR-82-0197
Pub. in Proceedings of the First International Conference on the Aviation Weather System, n1 p111-114, 4-6 May 81, Montreal, Canada.

No abstract available.

N82-27319/4 PC **A06**/MF **A01**
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
Quiet Short-Haul Research Airplane (QSRA) Model Select Panel Functional Description.
D. M. Watson. May 82, 121p A-8915, NAS1.15:84243, NASA-TM-84243

The QSRA, when equipped with programmable color cathode ray tube displays, a head up display, a general purpose digital computer and a microwave landing system receiver, will provide a capability to do handling qualities studies and terminal area operating systems experiments as well as to enhance an experimenter's ability to obtain repeatable aircraft performance data. The operating systems experiments include the capability to generate minimum fuel approach and departure paths and to conduct precision approaches to a STOLport runway. The mode select panel is designed to provide both the flexibility needed for a variety of flight test experiments and the minimum workload operation required by pilots flying into congested terminal traffic areas.

PB82-252313 PC **A14**/MF **A01**
Berger (Louis) International, Inc., East Orange, NJ.
Syrian Arab Republic Comprehensive Transport Stydy. Volume VI. Other Modes and Related Industries.
Mar 81, 316p AID-PN-AJJ-420
See also Volume 5, PB82-252305 and Volume 7, PB82-252321. Sponsored in part by Ministry of Transport, Damascus (Syria). Prepared in cooperatin with Tippett-Abbett-McCarthy-Stratton, New York.
Also available in set of 7 reports PC E99, PB82-252255.

Syria's efforts to meet its transport needs through the year 2000 are succeeding even in such disparate subsectors as aviation, pipelines, construction, and storage. Syria easily meets current air travel demand with four domestic airports and an international airport at Damascus, with a second planned for Aleppo. The most urgent requirement in civil aviation is to revise the master plans of all these airports to eliminate obsolete or inefficient physical plants. Syria should modernize its air navigation system by establishing a regional traffic control center in concert with its Arab neighbors and by straightening out flight routes wherever possible. Feasibility studies should be conducted for pipelines between Homs, Al Raqqa, and Aleppo, and for new distribution centers at Damascus and Dera'a.

PB82-916902 PC **A12**/MF **A01**
National Transportation Safety Board, Washington, DC. Bureau of Administration.
Aircraft Accident Reports - Brief Format, U.S. Civil Aviation, Issue Number 1 of 1981 Accidents.
12 Feb 82, 252p NTSB-BA-82-2
See also PB82-916905.
Paper copy also available on subscription, North American Continent price $130.00/year; all others write for quote.

The publication contains selected aircraft accident reports, in brief format, occurring in civil aviataviation operations during calendar year 1981. The 300 General Aviation accidents contained in this publication represent a random selection. This publication is issued irregularly, normally fifteen times each year. The brief format presents the facts, conditions, circumstances, and probable cause(s) for each accident. Additional statistical information is tabulated by injury index, injuries, and causal factors.

PB82-916904 PC **A14**/MF **A01**
National Transportation Safety Board, Washington, DC. Bureau of Administration.
Aircraft Accident/Incident Reports - Brief Format, Supplemental Issue 1980 Accidents.
29 Mar 82, 323p NTSB-BA-82-3
Paper copy also available on subscription, North American Continent price $130.00/year; all others write for quote.

This publication contains reports of aircraft accidents and incidents that occurred in 1980 and have not been included in a prior issue of briefs. Included are 14 U.S. air carrier accidents, 18 U.S. air carrier incidents, 106 general aviation accidents occurring on U.S. soil, and 49 general aviation incidents. Four foreign air carrier incidents, 25 foreign general aviation accidents and 1 foreign general aviation incident that were investigated by the National Transportation Safety Board are also included. This publication is the final issue of Briefs of Accidents that occurred in calendar year 1980.

PB82-916905 PC **A12**/MF **A01**
National Transportation Safety Board, Washington, DC. Bureau of Administration.
Aircraft Accident Reports - Brief Format, U.S. Civil Aviation, Issue Number 2 of 1981 Accidents.
21 May 82, 270p NTSB-BA-82-4
See also PB82-916906.

Paper copy also available on subscription, North American Continent price $130.00/year; all others write for quote.

The publication contains selected aircraft accident reports, in brief format, occurring in U.S. civil aviation operations during calendar year 1981. The 299 General Aviation accidents contained in this publication represent a random selection. This publication is issued irregularly, normally fifteen times each year. The brief format presents the facts, conditions, circumstances, and probable cause(s) for each accident. Additional statistical information is tabulated by injury index, injuries, and causal factors.

PB82-916906 PC **A12**/MF **A01**
National Transportation Safety Board, Washington, DC. Bureau of Administration.
Aircraft Accident Reports - Brief Format, U.S. Civil Aviation, Issue Number 3 of 1981 Accidents.
25 May 82, 275p NTSB-BA-82-5
See also PB82-916907.

The publication contains selected aircraft accident reports, in brief format, occurring in U.S. civil aviation operations during calendar year 1981. The 300 General Aviation accidents contained in this publication represent a random selection. This publication is issued irregularly, normally fifteen times each year. The brief format presents the facts, conditions, circumstances, and probable cause(s) for each accident. Additional statistical information is tabulated by injury index, injuries, and casual factors.

1C. Aircraft

AD-A117 403/6 PC **A12**/MF **A01**
Boeing Military Airplane Co., Seattle, WA.
Application Actuation Trade Study.
Final rept. 25 Jul 79-25 Aug 81
T. R. Boldt, C. C. Chenoweth, I. S. Mehdi, E. T. Raymond, and L. Witonsky. Jan 82, 265p D180-25487-3, AFWAL-TR-81-3153
Contract F33615-79-C-3630

This report contains the results of The Airplane Actuation Trade Study program. The study, conducted in three phases, included establishment of actuation requirements; design of two airplanes (a baseline airplane and an all-electric airplane); and a trade study of the two airplanes including quantitative comparison data of weight, reliability and maintainability, and life cycle cost. The study results indicate that it is feasible to design a competitive power-by-wire actuation airplane. However, specific areas in hardware development need to be demonstrated through Research and Development programs to make the all-electric-airplane concept practical and low risk in the 1990+ time frame. Cost savings were identified with the all-electric airplane for the ATS mission. These came primarily from reduced secondary power system weight and complexity at some expense in ground checkout capability without running the engines. This study selected engine-shaft-mounted electric generators as opposed to airframe mounted accessor drives for the baseline airplane. Different mission/air vehicles will have to be studied individually to project cost and other benefits available from an all-electric airplane concept. The ATS study showed minor differences between hydraulic and all-electric applications, with a slight advantage toward an all-electric approach in terms of life cycle costs. (Author)

AD-A117 425/9 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
Holographic Interferometry Technique for Rotary Wing Aerodynamics and Noise.
Conference paper,
John K. Kittleson, and Yung H. Yu. 18 Jun 82, 14p
Paper from the Proceedings of the Army Sciences Conference (1982), 15-18 Jun 82.

In this paper, the concepts of holography and holographic interferometry, as applied to the visualization and measurement of the three-dimensional flow field near a rotor tip, are previewed, and initial experimental results of investigations of local shock structures and tip vortices behind the blade are presented. An additional method to visualize the flow in a three-dimensional manner is demonstrated, and finally, a method to quantitatively measure the three-dimensional flow, which will provide the necessary information to help improve helicopter performance and reduce noise, is introduced.

AD-A117 427/5 PC **A04**/MF **A01**
McDonnell Douglas Research Labs., St. Louis, MO.
Viscous Flowfields Induced by Three-Dimensional Lift Jets in Ground Effect.
Final technical rept. 1 Jul 79-30 Jun 80,
W. W. Bower, and G. R. Peters. 1 Jul 80, 71p Rept no. MDC-Q0768
Contract N00014-79-C-0635

An important consideration for VTOL aircraft design is the aerodynamic interaction between the lift jets and the ground plane. In an effort to predict this phenomenon for two jets, a finite-difference solution of the three-dimensional conservation equations of fluid mechanics, in combination with a turbulence model, has been developed for the case of incompressible flow. The solution technique is applied to the normal and oblique impingement of equal- and unequal-strength jets in ground effect with fountain formation. Fluid properties that characterize the flowfields are presented, and computed results are compared with data for the ground plane pressure distribution, fountain flow direction, wall-jet properties, and stagnation line shape.

AD-A117 448/1 PC **A08**/MF **A01**
McDonnell Douglas Corp., Long Beach, CA.
A Combined Hazard Index Fire Test Methodology for Aircraft Cabin Materials. Volume I.
Final rept. Sep 77-Nov 81,
H. H. Spieth, J. G. Gaume, R. E. Luoto, and D. M. Klinck. Apr 82, 168p DOT/FAA/CT-82/36-1
Contract DOT-FA77WA-4019
See also Volume 2, AD-A117 449.

This report describes a laboratory test method and the modeling of the resultant data to produce a means of ranking aircraft cabin materials for the combined hazards produced in a survivable post-crash fire. Ranking is based on reducing each hazard accumulating in a cabin during a 5-minute crash fire scenario to the common denominator of a passenger escape time. Combined Hazards Index (CHI) is expressed as the number of seconds of scenario burn time at which the sum of the fractional hazards doses reaches an escape limit. All data was obtained using a computer-augmented Ohio State University Calorimeter modified to measure the major combustion gases in addition to heat and smoke as a material burns. A computerized fire analysis model was developed to predict cabin environmental hazards from the laboratory data. A human survival model relating short term hazard dose to incapacitation time was incorporated in this program. The changing cabin environment was compared continuously with the human survival model limits to calculate the unaided escape time ranking for each material.

AD-A117 449/9 PC **A10**/MF **A01**
McDonnell Douglas Corp., Long Beach, CA.
A Combined Hazard Index Fire Test Methodology for Aircraft Cabin Materials. Volume II.
Final rept.,
H. H. Spieth, J. G. Gaume, R. E. Luoto, and D. M. Klinck. Apr 82, 217p DOT/FAA/CT-82/36-2
Contract DOT-FA77WA-4019
See also Volume 1, AD-A117 448.

This report supplements the description of the methodology developed for ranking cabin materials for combined hazards generated in a survivable crash fire presented in Part I of the report. More comprehensive procedures are presented for the calibration and operation of the computer-augmented Ohio State University Calorimeter modified to derive the new materials fire hazards testing apparatus known as the Combined Hazards Analysis System (CHAS). Definitive derivations of the human survival models for temperature, smoke, and toxic gases used in the hazards analysis and a thorough presentation of the mathematics used in the Fortran Fire Analysis Computer Program are presented. A full description of the full-scale fire testing method used during the development and demonstration phases of the program is presented to give a better understanding of the capability of the laboratory methodology to rate materials on the basis of the relative passenger escape time potential from a cabin section. Part II is, essentially a working manual which will assist greatly those committed to duplicating and successfully operating the CHAS. The CHAS methodology is useful for development of new fire resistant materials. (Author)

AD-A117 465/5 PC **A08**/MF **A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
Acta Aeronautica et Astronautica Sinica. Volume 2, Number 3.
23 Jun 82, 159p Rept no. FTD-ID(RS)T-0285-82
Edited trans. of mono. Acta Aeronautica et Astronautica Sinica (China) v2 n3 p1-103 Sep 81.

No abstract available.

AD-A117 469/7 PC **A02**/MF **A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
Design of the Leading Edge of a Delta Wing.
Dekang Xu. 21 Jun 82, 17p Rept no. FTD-ID(RS)T-0470-82
Edited trans. of Guoji Hangking (China) n1 p18-20 1982.

No abstract available.

AD-A117 543/9 PC **A03**/MF **A01**
Stevens Inst. of Tech., Hoboken, NJ. Dept. of Mechanical Engineering.
Research on the Behavior of Cascaded Airfoils under Conditions of High Mean Loading and Flow Unsteadiness.
Final technical rept. 15 Sep 79-31 Jan 82.
30 Jun 82, 49p
Contract N00014-79-C-0765

This contract, transferred to the auspices of the SQUID program effective 1 March 1981, was originally planned as a three year program. The objectives were predominantly experimental in nature: to measure the unsteady velocities in the rotor passage of a single stage axial flow compressor and map the velocity field at operating conditions near rotor blade stall. For this purpose a laser doppler velocimeter was to be developed and married to a new single stage axial flow compressor designed expressly for this purpose. At the premature conclusion of the contract, the first successful velocity determination in the running compressor had not been obtained, although the LDA and its associated subsystem was operational. Some compressor cascade modelling studies, ultimately intended to be guided, or 'calibrated' by the experimental results are only partially completed. (Author)

AD-A117 629/6 PC **A04**/MF **A01**
Federal Aviation Administration Technical Center, Atlantic City, NJ.
Examination of Aircraft Interior Emergency Lighting in a Postcrash Fire Environment.
Final rept. Mar 78-Dec 80,
James Demaree. Jun 82, 53p Rept no. DOT/FAA/CT-82/55

This report describes the effectiveness of emergency interior lighting in a wide-body aircraft test fuselage subjected to elevated temperatures and dense smoke generated by an external fuel fire and interior materials fire. Photometric measurements show significant smoke stratification. The dense smoke at the ceiling can reduce the effectiveness of emergency lighting sources in the upper one third of the aircraft cabin in the very early stages of a cabin fire, while temperatures are survivable in the lower two thirds of the cabin. Placing emergency lighting sources at or below the height of the passenger seat armrest can increase the time span over which the lights are effective. (Author)

AD-A117 665/0 PC **A05**/MF **A01**
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
Establishment of a Rotor Model Basis.
Technical paper,
R. E. McFarland. Jun 82, 93p NASA-A-8605, NASA-TP-2026, USAAVRADCOM-TR-81-A-14

Radial-dimension computations in the RSRA's blade-element model are modified for both the acquisition of extensive baseline data and for real-time simulation use. The baseline data, which are for the evaluation of model changes, use very small increments and are of high quality. The modifications to the real-time simulation model are for accuracy improvement, especially when a minimal number of blade segments is required for real-time synchronization. An accurate technique for handling tip loss in discrete balde models is developed. The mathematical consistency and conver-

gence properties of summation algorithms for blade forces and moments are examined and generalized integration coefficients are applied to equal-annuli midpoint spacing. Rotor conditions identified as constrained and balanced are used and the propagation of error is analyzed. (Author)

AD-A117 671/8 PC **A03**/MF **A01**
Federal Aviation Administration, Washington, DC. Office of Civil Aviation Security.
Effectiveness of the Civil Aviation Security Program.
Semiannual rept. no. 15, 1 Jul-31 Dec 81.
12 Apr 82, 42p Rept no. DOT/FAA/ACS-82-15
Report to the Congress. See also AD-A110 422.

The report includes an analysis of the current threat against civil aviation along with information regarding hijacking attempts, security incidents, bomb threats, and passenger screening activity. It also summarizes ongoing activities to assure adequate protection of civil air commerce against hijacking/sabotage and related crimes, and other aspects of the Civil Aviation Security Program. (Author)

AD-A117 732/8 PC **A04**/MF **A01**
General Electric Co., Binghamton, NY. Armament and Electrical Systems Dept.
Motor Technology for Electric Remotely Piloted Vehicle (RPV).
Final rept. Sep-Dec 81,
M. M. Walters, and D. N. Taneja. May 82, 64p AES-13609, AFWAL-TR-82-2024
Contract F33615-81-C-2056

Electric propulsion offers significant advantages over the present gasoline engine propulsion system on a remotely piloted vehicle (RPV). The advantages are the result of technical advances in batteries, power transistors, permanent magnets and control methods. This program is a continuation of an exploratory development effort by the Air Force in electric propulsion for the RPV. This report presents the parametric data from a trade study of nine motor/control designs. The relationship between cost, weight and efficiency of the motor/control system is determined so that the entire RPV propulsion system can be optimized. An additional motor/control design is presented which considers a high voltage source and high speed propeller. (Author)

AD-A117 747/6 PC **A03**/MF **A01**
Aircraft Research and Development Unit, Edinburgh (Australia).
Evaluation of New Iroquois Torquemeter PN 73-30-1.
Technical investigation rept.,
L. R. Ward. Jun 82, 32p Rept no. ARDU-TI-778

The purpose of this investigation was to supervise the installation of a prototype torquemeter in an Iroquois UH-1H and to evaluate the accuracy, damping, drift and ergonomic aspects of the new torquemeter. Tests showed that torquemeter accuracy was unacceptable and the indicating system was prone to significant drift. Tradesmen found adjustment of the 'zero set' difficult to perform due to poor access to the adjustment screw. Instrument markings in the range greater than 30 psi were obscured when viewed from the co-pilot's seat. The night-lighting of the instrument and the reflection characteristics of the glass cover were also unsatisfactory. The procedure for torquemeter adjustment for installed engine Data Plate Torque was found to be in error and a revised procedure is proposed. Several modifications to the instrument are recommended to be made before fleet-wide installation. A limited number of flight tests should be made to check that the production torquemeter and the new performance calculator are compatible. If significant delays occur before introduction of a suitable production torquemeter, an interim method of displaying maximum permissible torque is proposed.

AD-A117 815/1 PC **A03**/MF **A01**
Michigan Univ., Ann Arbor. Dept. of Aerospace Engineering.
System Optimization by Periodic Control.
Final rept. 1 Oct 76-31 Jan 82,
Elmer G. Gilbert. 31 Mar 82, 30p AFOSR-TR-82-0575
Grant AFOSR-77-3158

Research results obtained under the grant are summarized. Contributions to periodic control include: theory, computational methods and applications to aircraft cruise. The theory centers around necessary or sufficient conditions for optimality and gives information on whether or not periodic operation of a dynamic system gives better performance than steady-state operation. The treatment is comprehensive and includes new second-order conditions which have simplified assumptions and incorporate control constraints. Some of these results follow from a new approach to the derivation of higher-order necessary conditions. The approach does not require normality assumptions and has provided other new results, including second-order necessary conditions in optimal control. A method for computing periodic optima is described. It addresses difficulties observed in other approaches and has proved effective in example problems. Optimal aircraft cruise (specific range, endurance, peak altitude) was studied as an application of theoretical and computational techniques. Under special circumstances (e.g., altitude constraints, in low wing loading and drag, high thrust limits), it appears that periodic cruise is significantly better than steady-state cruise. Some research was also done on the theory of nonlinear systems. It includes: functional expansions for input-output maps, conditions for realizability, a backward shift approach to internally bilinear realizations and canonical forms for minimal-order realizations of two-power input-output maps. (Author)

AD-A117 877/1 PC **A04**/MF **A01**
System Planning Corp., Arlington, VA.
Alternative Employment Concepts for Remotely Piloted Vehicle (RPV) FLIR/TV Mission Payload.
Final rept.,
W. G. Howard, W. K. Evans, and S. Shrier. Dec 81, 70p Rept no. SPC-774
Contract DAAK50-80-C-0011

This study compared the operational potential of the RPV organization in a division that has rear area launch and recovery with that in a division that had independent sections. The study found that rear area launch and recovery could provide significant operational advantages including: a smaller basic load of air vehicles, more expeditious resupply of air vehicles, and reduced vulnerability of the ground systems. Reliable communications are required to make the rear area launch and recovery concept effective. (Author)

AD-A117 905/0 PC **A04**/MF **A01**
Dayton Univ., OH. Research Inst.
Dayton Aircraft Cabin Fire Model, Version 3, Volume I. Physical Description.
Final rept. 1 Apr 80-31 Mar 81,
Charles D. MacArthur. Jun 82, 57p UDRI-TR-81-159, DOT/FAA/CT-81/69-I
Contract DOT-FA74WA-3532
See also Volume 2, AD-A033 683.

Version 3 of the Dayton Aircraft cabin Fire Model (DACFIR) has been created as a refinement and generalization of earlier mathematical models for the computer simulation of fire growth in the cabin of a commercial transport airplane. The model uses data from laboratory tests on the cabin furnishing materials and a zone (control volume) representation of the cabin atmosphere to predict the accumulation of heat, smoke, and gases resulting from arbitrary ignition sources specified in the program input. The major improvements included in Version 3 are a revised cabin atmosphere model which allows for multiple compartments and the prescribed entry of exterior fire gases, and an implicit numerical integration technique for the atmosphere equations. Volume I of this report contains a full description of the model's predictions to the results of three full-scale cabin fire tests. Volume II consists of appendices which include a user's guide and listing of the computer code. (Author)

AD-A117 933/2 PC **A03**/MF **A01**
ARINC Research Corp., Annapolis, MD.
Reliability, Availability, Maintainability Data Tracking Plan Improved Guardrail V,
S. Jones, R. Foote, and H. Riser. Jun 82, 49p Rept no. 1599-01-2-2711
Contract DAAB07-78-A-6606

The objective of the IGRV RAM Tracking Plan is to provide continuous visibility of fielded equipment RAM performance to permit the PM SEMA to determine failure patterns, identify the necessity for in-depth engineering investigations, and assess the desirability of pursuing RAM improvement measures. The plan is designed to be consistent with the requirements contained in the Reliability, Availability, Maintainability Program Plan for Improved GUARDRAIL V. This IGRV RAM Tracking Plan defines the responsibilities, procedures, resources, and schedules necessary to develop, implement, and maintain a RAM audit trail during the life of the system. (Author)

AD-A117 935/7 PC **A04**/MF **A01**
General Accounting Office, Washington, DC. Procurement, Logistics, and Readiness Div.
Aircraft Thrust/Power Management can Save Defense Fuel, Reduce Engine Maintenance Costs, and Improve Readiness.
29 Jul 82, 52p Rept no. GAO/PLRD-82-74
Report to the Chairman, Subcommittee on Defense, Committee on Appropriations, House of Representatives.

The Department of Defense spends billions of dollars annually on aircraft fuel and engine maintenance. Thrust/power management offers Defense the potential to save fuel and reduce engine maintenance by improving fuel efficiency and extending engine parts life. Improved fuel efficiency can increase flying hours and thus improve aircrew proficiency and readiness. Extended engine life can reduce frequency of maintenance and thereby increase aircraft availability and readiness. An effective thrust/power management program is vital to the Defense mission from a readiness, energy, and maintenance standpoint. The implications on readiness are quickly apparent when considering that flying hours were reduced in face of rapidly rising fuel costs. When considering the billions of dollars spent of aircraft fuel and maintenance, thrust/power management offers great potential for reducing these costs.

DE82012417 PC **A14**/MF **A01**
Westinghouse Electric Corp., West Lafayette, IN. Fluid Systems Lab.
Development of a High-Temperature Heat Pump Grain Dryer: Volume I. Main Body. Final Report, September 6, 1979-September 30, 1981.
M. R. Hogan, D. L. Ayers, G. H. Foster, O. C. Doering, and K. H. Hawks. 1981, 301p DOE/CS/40262-T1(V.1)
Contract AC01-79CS40262
Microfiche only after original copies are exhausted.

The objective of this work was to develop and test an electrically-driven, high-temperature heat pump grain dryer of a marketable capacity. An economic evaluation of heat pump grain drying was also conducted. The philosophy and constraints which guided the system design are given. A 60-kW maximum electrical demand is the most significant of these and required that the system air cycle be investigated thoroughly. This air cycle analysis and the subsequent results are reported in detail. Selection of the dryer volume, system configuration, and the heat pump design conditions are all affected by the analysis; this too is reported. Each step in the design process, including motor cooling, cold start-up, return air temperature stabilization, system control, and refrigerant distribution and control considerations, is documented. Field test procedures and equipment, data acquisition, and data reduction methods are documented. The results of the field test are divided into steady state performance and transient performance - the former describes the tests in terms of averaged data and the latter uses temporal comparisons to explain certain observations. The economic analysis is based on life cycle costs and accounts for such parameters as weather, variable energy costs, inflation, and the cost of capital. To put the results into perspective, the life cycle costs of current competitive drying systems are determined and compared to the heat pump. It is concluded that high-temperature heat pump grain drying is technically feasible. Moreover, its on-site energy consumption is from one-third to one-fifth that of liquefied petroleum gas dryers. However, under current and projected economic conditions, the energy savings do not justify the additional capital investment. Consequently, high-temperature heat pump grain drying is concluded to be uneconomical. (ERA citation 07:044046)

N82-27214/7 PC **A04**/MF **A01**
Rockwell International, Los Angeles, CA. North American Aircraft Operations.
Feasibility of SPF/DB Titanium Sandwich for LFC Wings.
Final Report.
F. T. Mcquilkin. Jun 82, 62p NASA-CR-165929
Contract NAS1-16236

The feasibility of fabricating SPF/DB titanium structures of sufficient smoothness to be used for laminar flow wing surfaces was demonstrated. Two methods of fabricating panels which meet the surface smoothness criteria were demonstrated. The first consists of superplasticity forming/diffusion bonding a panel using steel dies, then machining the surface to the required flatness and finish after forming. This approach, however, was estimated to be more costly than the second approach, in which the panel is formed against ceramic platens which produce the desired surface smoothness without subsequent finishing. Four panels were fabricated, and their surface quality was evaluated. The specified criteria for waviness compared with actual measured values on the panels is shown. The acceptable surface quality as well as feasibility of the laminar flow control surface design, in which separate strips incorporating the boundary layer bleed provisions are bonded into slots on the surface, was also demonstrated.

N82-27233/7 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Characteristics of Future Aircraft Impacting Aircraft and Airport Compatibility.
D. W. Conner. May 82, 26p NASA-TM-84476, NAS 1.15:84476

Results are reported of an opinion survey of selected individuals at the decision-making level within the five major manufacturers of transport aircraft in the United States and Europe. Opinions were obtained concerning both possible and probable existence of over 50 compatibility-related characteristics of transport aircraft in use in the years 1990, 2000, and 2010. The maximum size of aircraft is expected to increase, at a roughly uniform rate, to the year 2010 by 85 percent in passengers, 55 percent in airfreighter payload, and 35 percent in gross weight weight. Companion to the expected growth in payloads and gross weight was the identification of probable increases in aircraft geometrical dimensions and component capability, and use of fully double-decked passenger compartments. Wing span will increase considerably more than normally expected to provide wings of higher aspect ratio. New aircraft features coming into probable use include large turboprops, synthetic jet-A fuel, winglets, wake-vortex-reducing devices and laminar flow control. New operational concepts considered probable include steep approaches, high-speed turnoffs, and taxiway towing for the aircraft, plus passenger bypass of the terminal building, expedited handling of belly cargo and an intermodal cargo container for the payloads.

N82-27235/2 PC **A05**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Aerodynamic Investigations to Determine Possible Ice Flight Paths.
W. Burgsmueller, H. Frenz, P. May, and G. Anders. Mar 82, 77p NASA-TM-76648, NAS 1.15:76648
Contract NASW-3541
Transl. Into English of Vereinigte Flugtechnische Werke--Fokker Gmbh Rept-EF-586, 18 Jan. 1977 84 p. Transl. By Kanner (Leo) Associates, Redwood City, Calif.

After flights with the VFW 614 under severe icing conditions, damage to the engine was found. In wind tunnel tests a determination of the origin of this ice was made; it is supposed that the damage was caused by this ice. On the modified flight test model of the VFW 614 on a 1:15 scale, measurements were conducted in the VFW-Fokker wind tunnel with exposed particles which represented the free ice. The results of this testing are presented.

N82-27280/8 PC **A11**/MF **A01**
Operations Research, Inc., Silver Spring, MD.
Benefit Cost Analysis of the Aircraft Energy Efficiency Program.
Final Report.
J. Bauchspies, F. Hopkins, and L. Kaplan. Nov 80, 242p NASA-CR-169116, NAS 1.26:169116
Contract NASW-2961
Revised.

Analyses were reviewed in light of rapid and dramatic changes in fuel cost and availability, as well as significant changes in the economic and political climate relating to these factors.

N82-27288/1 PC **A02**/MF **A01**
Aeronautical Research Inst. of Sweden, Stockholm.
Comparison of Different Fighter Aircraft Load Spectra.
A. Magnusson. 1982, 16p FFA-TN-1982-02
Contract F-INK-82223-77-001-21-001

Open hole specimens, made from 3 mm thick aluminum 7075-T6 3627-48 clad sheet, were subjected to fighter aircraft load spectra. The influence on fatigue life of spectrum variations, e.g., severe negative maneuver loads, maximum load truncation and cycle omission was studied. Six load spectra, including fighter aircraft loading standard for fatigue evaluation (FALSTAFF) and a cycle truncated version of FALSTAFF, containing 9006 cycles per 200 flights, i.e., half the original number, were investigated. Severe negative maneuver loads as well as maximum load truncation reduce the fatigue life. Truncated FALSTAFF produces the same fatigue life as the original sequence.

N82-27289/9 PC **A02**/MF **A01**
Advanced Engineering Lab., Adelaide (Australia).
Composite Flight Test Boom for NOMAD N22b Aircraft.
N. C. Frost. Nov 81, 20p AEL-0086-TM, AR-002-598

The design, analysis and manufacturing processes are described for an instrumentation nose boom for a flight test program on the Nomad aircraft.

N82-27743/5 PC **A07**/MF **A01**
Curtiss-Wright Corp., Wood-Ridge, NJ.
Advanced Stratified Charge Rotary Aircraft Engine Design Study.
P. Badgley, M. Berkowitz, C. Jones, D. Myers, and E. Norwood. 29 Jan 82, 149p NASA-CR-165398, NAS 1.26:165398
Contract NAS3-21285

A technology base of new developments which offered potential benefits to a general aviation engine was compiled and ranked. Using design approaches selected from the ranked list, conceptual design studies were performed of an advanced and a highly advanced engine sized to provide 186/250 shaft Kw/HP under cruise conditions at 7620/25,000 m/ft altitude. These are turbocharged, direct-injected stratified charge engines intended for commercial introduction in the early 1990's. The engine descriptive data includes tables, curves, and drawings depicting configuration, performance, weights and sizes, heat rejection, ignition and fuel injection system descriptions, maintenance requirements, and scaling data for varying power. An engine-airframe integration study of the resulting engines in advanced airframes was performed on a comparative basis with current production type engines. The results show airplane performance, costs, noise & installation factors. The rotary-engined airplanes display substantial improvements over the baseline, including 30 to 35% lower fuel usage.

N82-27865/6 PC **A03**/MF **A01**
Airbus Industrie, Blagnac (France).
Airbus Industrie and Community Noise.
J. Chausonnet. 1981, 35p
Presented at the Intern. Symp. On Transportation Noise, Pretoria, 21-23 Oct. 1981.

The contributions of the total noise perceived outside an aircraft during takeoff and landing by the engine and the aerodynamics of the aircraft are considered. The reduction of engine noise by design, the location of the engine and acoustic treatment of the nacelles is discussed. Aerodynamic noise reduction is considered in terms of aircraft design, operational procedures, and aircraft weight. A noise measuring facility used for checking operational procedures and measuring noise levels is described.

N82-28134/6 PC **A03**/MF **A01**
Stanford Univ., CA. Joint Inst. of Aeronautics and Acoustics.
The Annoyance of Impulsive Helicopter Noise.
Final Report, Jan. - Dec. 1981.
K. Karamcheti. Dec 81, 27p NASA-CR-169123, NAS 1.26:169123
Contract NAG1-17

A total of 96 impulsive and non-impulsive sounds were rated for annoyance by 10 subjects. The signals had the same amplitude spectrum with a maximum frequency of 4.75 kHz. By changing the phase of the spectral components different levels of impulsivity were obtained. The signals had coefficients of impulsivity of 10,8, 7,9, and -0.2 respectively. Further, signals had intensity levels 89 and 95 dBA, pulse repetition rates 10 and 20 Hz, and half the signals had pink noise added at a level 12 dBA lower than the level of the sound. The significant results were: The four females and six male subjects rated the impulsive sounds respectively 3.7 dB less annoying and 2.6 dB more annoying than the non-impulsive sounds. Overall, impulsivity had no effect. The hish pulse repetition rate increased annoyance by 2.2 dB. Addition of pink noise increased annoyance of the non-impulsive sounds 1.2 dB, but decreased the annoyance of the impulsive sounds 0.5 dB.

PAT-APPL-6-301 078 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Leading Edge Flap System for Aircraft Control Augmentation.
Patent Application,
D. M. Rao. Filed 10 Sep 81, 15p N82-25240/4, NASA-CASE-LAR-12787-1
Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Traditional roll control systems such as ailerons, elevons or spoilers are least effective at high angles of attack due to boundary layer separation over the wing. Independently deployed leading edge flaps on the upper surfaces of vortex stabilized wings are used to shift the center of lift outboard. A rolling moment is created that is used to control roll in flight at high angles of attack. The effectiveness of the rolling moment increases linearly with angle of attack. No adverse yaw effects are induced. In an alternate mode of operation, both leading edge flaps are deployed together at cruise speeds to create a very effective airbrake without appreciable modification in pitching moment. Little trim change is required.

PAT-APPL-6-340 679 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Thermal Insulated Duct Support.
Patent Application,
Richard A. Brown. Filed 19 Jan 82, 5p AD-D009 582/8
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A sleeve to which further support or bracket means may be connected, surrounds the duct. The sleeve and duct each have retaining angles welded on their inner and outer surfaces, respectively. Pairs of the angles are adjacent and have a thermal insulating ring held tightly between them through which duct support loads are distributed.

PB82-250135 PC **A07**/MF **A01**
Wyle Labs./Wyle Research, Arlington, VA.
Noise Exposure of Civil Aircarrier Airplanes Through the Year 2000. Volume I: Methods, Procedures, Results.
Final rept. Aug 77-Feb 79,
Carroll Bartel, and Louis C. Sutherland. Feb 79, 140p WR-78-11, EPA/550/9-79/313-A
Contract EPA-68-01-3514
See also Volume 1, PB82-250143.

This report presents results of an estimate of the national exposure to aircarrier aircraft noise through the year 2000. The forecast was carried out to show the effect of two types of noise abatement options. The first consisted of modifications to FAR Part 36 proposed to the Federal Aviation Administration (Notice 76-22) by the U.S. Environmental Protection Agency which would establish lower noise limits for newly designed aircraft in the years 1980 and 1985. The second type consisted of alternative power cutback procedures (FAA AC 91-39 and two variations of ALPA/Northwest Airlines procedure) coupled with minor variations on approach procedures.

PB82-250143 PC **A13**/MF **A01**
Wyle Labs./Wyle Research, Arlington, VA.
Noise Exposure of Civil Aircarrier Airplanes Through the Year 2000. Volume II: Appendices A through F.
Final rept. Aug 77-Feb 79,
Carroll Bartel, and Louis C. Sutherland. Feb 79, 288p WR-78-11, EPA/550/9-79/313-B
Contract EPA-68-01-3514
See also Volume 1, PB82-250135

This report presents results of an estimate of the national exposure to aircarrier aircraft noise through the year 2000. The forecast was carried out to show the effect of two types of noise abatement options. The first consisted of modifications to FAR Part 36 proposed to the Federal Aviation Administration (Notice 76-22) by the U.S. Environmental Protection Agency which would establish lower noise limits for newly designed aircraft in the years 1980 and 1985. The second type consisted of alternative power cutback procedures (FAA AC 91-39 and two variations of ALPA/Northwest Airlines procedure) coupled with minor variations on approach procedures.

PB82-872938 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Parachutes and Parachuting: Non-Space Applications. July, 1975-August, 1982 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jul 75-Aug 82.
Aug 82, 264p
Supersedes PB81-874562.Prepared in cooperation with the National Aeronautics and Space Administration, Washington, DC.

This bibliography contains citations concerning the design, testing, certification, performance, and production of parachutes and parachute materials and systems for military and civilian aircraft and personnel. Dynamics and aerodynamics of parachute descent are considered. Attention is also given to psychological factors related to parachute descent. (This updated bibliography contains 261 citations, 56 of which are new entries to the previous edition.)

PB82-873688 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Aircraft: Computer Applications. 1973-August, 1982 (Citations from Information Services in Mechanical Engineering Data Base).
Rept. for 1973-Aug 82.
Aug 82, 89p
Supersedes PB81-880874.Prepared in cooperation with Cambridge Scientific Abstracts, Washington, DC.

This bibliography contains citations concerning aircraft system simulation by computer. Mathematical modelling, design and manufacturing of aircraft, aircraft components and systems, and avionics by use of computers and computer techniques are also included. Computerized aircraft operation analysis is also considered. (This updated bibliography contains 95 citations, 18 of which are new entries to the previous edition.)

1D. Aircraft Flight Control and Instrumentation

AD-A117 486/1 PC **A02**/MF **A01**
Army Research and Technology Labs., Moffett Field, CA. Aeromechanics Lab.
Speech Command Auditory Display System (SCADS).
Conference paper,
James W. Voorhees, Kristine M. Marchionda, and Valerie L. Atchison. 18 Jun 82, 9p
Paper from the Proceedings of the Army Sciences Conference (1982), 15-18 Jun 82.

The missions of the helicopter, within both the military and the civil sector, have changed rather dramatically over the last 20 years. The military's experience is Southeast Asia during the 1960's demonstrated the wide range of missions that could be accomplished by rotary wing aircraft: fire fighting, heavy lift, and large scale medical evacuations, as well as tactical missions of troop transport and close air support. The post-Vietnam civilian uses for helicopters have duplicated several of the military missions, resulting in an added interest in helicopters in both the military and the civilian sectors. This increased interest has also led to rapid advances in rotorcraft technology. As helicopters have become much more capable, there has been an increasing sophistication in flight controls, power plant systems, and in cockpit displays. This combination of the increase of types of missions and the increase in cockpit sophistication has created a new set of problems. The limiting factor for many types of helicopter missions is now the pilot; and the limitation appears to be specifically related to information transfer. This information transfer is in the form of aircraft status information to the pilot, and information transfer from the pilot back to the aircraft in the form of control manipulations. (Author)

AD-A117 745/0 PC **A05**/MF **A01**
Federal Aviation Administration Technical Center, Atlantic City, NJ.
Light Aircraft Piston Engine Carburetor Ice Detector/Warning Device Sensitivity/Effectiveness.
Final rept. Jun 79-Oct 81,
William Cavage, James Newcomb, and Keith Biehl. Jun 82, 93p Rept no. DOT/FAA/CT-82/44
See also rept. no. FAA-ED-18-5A dated Apr 81.

A comprehensive test cell data collection and evaluation effort to review sensitivity and accuracy of 'off-the-shelf' carburetor ice detection/warning devices for general aviation piston engine aircraft was conducted. Presented herein are results, observations, and conclusions drawn from over 150 hours of test cell engine carburetor ice operations on a Teledyne Continental Motors 0-200A engine. Static sea level test cell engine operations were conducted to review carburetor ice detectors/warning devices sensitivty and accuracy during actual carburetor icing, determine internal carburetor ice accumulation locations, ascertain how ice formation propagates through the carburetor, observe carburetor performance during ice build-up and consider most advantageous location for a carburetor ice detector. Also presented is a review of the Federal Aviation Administration's carburetor accident/incident data relative to aircraft type, pilot qualifications, time of year and location by state where carburetor ice was a factor. (Author)

AD-A117 876/3 PC **A06**/MF **A01**
Boeing Commercial Airplane Co., Seattle, WA.
Aircraft Alerting Systems Standardization Study. Phase IV. Accident Implications on Systems Design.
Final rept. Jul 81-Jun 82,
D. C. Hanson, W. W. Howison, S. F. Chikos, and B. L. Berson. Jun 82, 121p D6-51464, DOT/FAA/RD-82/26
Contract DOT-FA79WA-4268
Prepared in cooperation with Lockheed Aircraft Co., and Douglas Aircraft Co. See also AD-A090 834.

This study, the fourth in a series having evolved from a study of independent altitude monitor requirements and alerting system criteria, has developed a set of substantiated guidelines for the design of aircraft alerting systems. In the course of this work, the FAA concluded that a system which went beyond the function of an alerting system might be useful. The study was extended to examine the question as to whether a system could function as a monitor of flight safety, a system that could aid the pilots in resolving problems and contribute to reducing the number of future accidents. The study established the feasibility of the concept of complementing the alerting system with a computer to perform the flight phase status monitor function. (Author)

AD-A117 918/3 PC **A09**/MF **A01**
Boeing Aerospace Co., Seattle, WA. Engineering Technology Div.
Development and Test of a Digital/Optical Linear Position Transducer.
Final rept. Aug 80-Feb 82,
G. E. Miller, T. A. Lindsay, B. E. Johnson, and J. M. Ewing. Jun 82, 199p USAAVRADCOM-TR-82-D-6
Contract DAAK51-80-C-0028

This report covers the design, development, fabrication, and testing of an optically analog linear position transducer with a full-scale displacement of 6 inches and an equivalent resolution of twelve bits. The transducer is electrically passive and interfaces with the associated Electronic Interface Unit through fiber optics only. The EIU provides the necessary analog-to-digital conversion. The transducer was tested both functionally and environmentally. (Author)

AD-A117 919/1 PC **A06**/MF **A01**
General Electric Co., Binghamton, NY. Aircraft Equipment Div.
Non-Complex Item Development Specification for a Feasibility Model of an Electronic Master Monitor and Advisory Display System (EMMADS).
Interim rept. no. 4, Jun 79-Jun 81.
Jun 81, 112p ACS-12, 383, USAAVRADCOM-TR-79-0270-4
Contract DAAK80-79-C-0270

This report is a specification establishing the requirements, quality assurance provisions, and necessary delivery preparations for a feasibility model of an Electronic Master Monitor and Advisory Display System for a CH-47C helicopter. (Author)

N82-27292/3 PC **A04**/MF **A01**
AOA Apparatebau Gauting G.m.b.H. (Germany, F.R.).
Torsional Stiffness Element Based on Cobalt-Samarium Magnets.
Final Report.
R. Osthermayer. Dec 81, 70p BMFT-FB-W-81-044, ISSN-0170-1339
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

The feasibility of a strapdown turn and bank indicator with an electromagnetic torsional stiffness element based on cobalt samarium permanent magnets was investigated. Characterization of the suitability of this magnetic material in fulfilling design requirements was stressed. Theoretical fundamentals for the tailoring of magnetic heads were reviewed. Cobalt samarium disks were magnetized axially in such a way that over a range of 18 deg a linear relationship between magnetic induction and the axial deviation angle exists. With these magnets, electromagnetic torsional stiffness elements were built in which the torsion constant is adjustable by the current. Alternative torsional stiffness elements with constant magnetization, but specific profiling of the magnets as well as magnets in connection with a specific current were also studied on a model for dynamic applications. Results validate the mechanical torsional stiffness element design and confirm the magnetic properties of cobalt samarium.

N82-27293/1 PC **A07**/MF **A01**
Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
Impact of Advanced Avionics Technology and Ground Attack Weapon Systems.
Feb 82, 147p AGARD-CP-306, ISBN-92-835-0310-4
Meeting Held at Agheos-Andreas, Greece, 19-23 Oct. 1981.

No abstract available.

PB82-233941 PC **A02**/MF**A01**
Sentralinstitutt for Industriell Forskning, Oslo (Norway).
Norgs Teknisk-Naturvitenskapelige Forskningsrad: Litteraturoversikter over Lagrings- og Transportmetoder for Metan. Anvendelse av Faste Adsorpsjonsmidler (Literature Survey on Methods for Storage and Transport of Methane. Application of Solid Adsorbents).
Final rept.,
Gerd S. Haegh. 20 Nov 81, 23p 81-03-08-2, ISBN-82-7267-406-8
Text in Norwegian.

The report gives a review of methods for storage and transport of methane with emphasis on the use of adsorption-tanks. Included are adsorption studies with zeolites, activated charcoal, metals, etc. as well as transport and storage of methane in the form of gel or methane hydrate.

1E. Air Facilities

AD-A117 487/9 PC **A02**/MF **A01**
Federal Aviation Administration Technical Center, Atlantic City, NJ.
Identification of Exit Taxiways (Retroreflective Markers Only).
Interim rept. Mar 81-May 82,
Larry W. Hackler. Jun 82, 14p Rept no. DOT/FAA/CT-82/77

This project is being performed in response to an SRDS request to perform a more extensive evaluation and inservice test of a method using surface retroreflective markers for identifying short-radius exit taxiways (low-speed exits). The markers were installed at the Atlantic City (Federal Aviation Administration Technical Center) Airport. The evaluation provided additional information to help insure that the system will be acceptable to users. This report describes the re-

sults and gives plans for conducting the inservice test. (Author)

AD-A117 520/7 PC **A03**/MF **A01**
Kilkeary, Scott and Associates, Inc., Annapolis, MD.
A State-of-the-Art Survey of the Development of Taxiway Guidance and Control Systems.
Final rept.,
Charles A. Douglas. Sep 81, 41p DOT/FAA/RD-81/87
Contract N68335-80-C-2008
Sponsored in part by Contract DOT-FA77WAI-786.

This study consisted of a review and analysis of the historical background of taxiway lighting and marking, its functions and development. The study emphasized the block control system used at Heathrow, the problems associated with manual and automated control of stop, hold and clearance bars, and the problems associated with automated surface movement control. The study provides the present status of developments and recommendations for future research endeavors. (Author)

AD-A117 587/6 PC **A08**/MF **A01**
BDM Corp., Vienna, VA.
The Study of Foreign Object Damage Caused by Aircraft Operations on Unconventional and Bomb-Damaged Airfield Surfaces.
Final rept. Sep 80-Jun 81,
D. N. Beatty, F. Readdy, J. J. Gearhart, and R. Duchatellier. Jun 81, 172p BDM/W-81-029-TR, AFESC/ESL-TR-81-39
Contract F08635-80-C-0206

This technical report documents the results of analyses conducted to assess the current level of technology available to determine the probability and extent of FOD to aircraft operating from conventional and bomb-damaged airfield surfaces. The various mechanisms (i.e., jet blast, tire/ground interaction,...) which can create particles which can then cause damage and the level of susceptibility of various aircraft to damage are considered. Engine and airframe vulnerability to FOD is assessed and FOD prevention techniques currently being used are evaluated. The analysis concludes that the current level of technology only permits a qualitative understanding a FOD potential and identifies the information and data necessary to develop a quantitative relationship between debris characteristics and the extent of damage. In addition, a testing program is recommended to establish the quantitative relationship and to permit the development of a prediction methodology. (Author)

AD-A117 597/5 PC **A05**/MF **A01**
Electromagnetic Compatibility Analysis Center, Annapolis, MD.
Microwave Landing System (MLS) Channel Plans and Traffic Loading.
Final rept.,
A. Koshar, and J Smithmyer. May 82, 94p ECAC-CR-82-032, DOT/FAA/RD-81/113
Contract DOT-FA70WA1-175

A Standard Traffic Loading Model (STLM) was constructed and the pulse traffic within the STLM was determined. Four proposed channel plans were compared to determine their ability to satisfy the channel requirements within the STLM. (Author)

AD-A117 599/1 PC **A05**/MF **A01**
Transportation Systems Center, Cambridge, MA.
Airport Landside. Volume I. Planning Guide.
Final rept. Jan 78-Sep 80,
L. McCabe, and M. Gorstein. Jun 82, 78p DOT-TSC-FAA-82-4-1, FAA-EM-80-8-1
See also Volume 2, AD-A117 600.

This volume describes a methodology for performing airport landside planning by applying the Airport Landside Simulation Model (ALSIM) developed by TSC. For this analysis, the airport landside is defined as extending from the airport boundary to the aircraft gate. The model routes simulated enplaning and deplaning passenger groups through a series of essential processing facilities. At the simulated facilities, queueing and service processes are modeled. Flow, queueing time, queue length, and occupancy statistics are produced. This guide describes how the model output may be applied to a landside capacity analysis. It also discusses using the model for management of daily operations and airport design. A description of input data necessary for model operation is presented with examples using data from Miami, Denver, and La Guardia airports.

AD-A117 600/7 PC **A06**/MF **A01**
Transportation Systems Center, Cambridge, MA.
Airport Landside. Volume II. The Airport Landside Simulation Model (ALSIM) Description and Users Guide.
Final rept. Jan 78-Sep 80,
L. McCabe, and M. Gorstein. Jun 82, 101p DOT-TSC-FAA-82-4-2, FAA-EM-80-8-2
See also Volume 3, AD-A117 601.

This volume provides a general description of the Airport Landside Simulation Model. A summary of simulated passenger and vehicular processing through the landside is presented. Program operating characteristics and assumptions are documented and a complete description of the input data required for simulation operation is furnished. Model outputs necessary for analysis of landside congestion include flow, queue length, queueing time and occupancy. Summaries of values of these parameters, obtained from a simulation run, are shown as examples. Time series of flow and queue length produced during the simulation run are also exhibited.

AD-A117 601/5 MF **A01**
Transportation Systems Center, Cambridge, MA.
Airport Landside. Volume III. ALSIM Calibration and Validation.
Final rept. Jan 78-Sep 80,
L. McCabe, and M. Gorstein. Jun 82, 209p DOT-TSC-FAA-82-4-3, FAA-EM-80-8-3
See also Volume 4, AD-A117 602.
Availability: Microfiche copies only.

This volume discusses calibration and validation procedures applied to the Airport Landside Simulation Model (ALSIM), using data obtained at Miami, Denver and LaGuardia Airports. Criteria for the selection of a validation methodology are described. The chosen methodology consists of two parts: (1) plotted comparisons of ALSIM output and corresponding field data; and (2) a hypothesis test based upon the probability of occurrence of field data within two simulated standard deviations of the simulated mean at each time point. Five simulation runs with different random number streams were used to produce time series of flow and queue length data at landside processors selected for comparison. Mean values and standard deviations were obtained at each time point for plotted and statistical comparison. Results are displayed in this volume. Satisfactory results were obtained at security stations, parking facility exits, customs and immigration. Ticket counter and curbside facilities failed to display good agreement. Gates, bagclaim areas and car rental counters were not compared for reasons specified in the report.

AD-A117 602/3 PC **A13**/MF **A01**
Transportation Systems Center, Cambridge, MA.
Airport Landside. Volume IV. Appendix A. ALSIM AUXILIARY and MAIN Programs.
Final rept. Jan 78-Sep 80,
L. McCabe, and M. Gorstein. Jun 82, 279p DOT-TSC-FAA-82-4-4, FAA-EM-80-8-4
See also Volume 4, AD-A117 603.

This Appendix describes the Program Logic of the Airport Landside Simulation Model (ALSIM) AUXILIARY and MAIN Programs. Both programs are written in GPSS-V. The AUXILIARY program is operated prior to the MAIN Program to create GPSS transactions representing Enplaning Passenger groups from the input flight schedule. The transactions are written on a JOB-TAPE file for subsequent use by the MAIN program. The MAIN Program creates greeter and deplaning passenger transactions and enacts the movements of all passengers and visitors through the landside.

AD-A117 603/1 PC **A14**/MF **A01**
Transportation Systems Center, Cambridge, MA.
Airport Landside. Volume V. Appendix B. ALSIM Subroutines.
Final rept. Jan 78-Sep 80,
L. McCabe, and M. Gorstein. Jun 82, 321p DOT-TSC-FAA-82-4-5, FAA-EM-80-8-5
See also Volume 1, AD-A117 599.

This Appendix describes the operation of ten subroutines used to support the AUXILIARY and MAIN programs of ALSIM. Flow charts and listings of all programs are provided. The major portion describes the FORTRAN subprogram FORTM which is used to read input data, assign values to matrix elements, perform matrix searches and assign parameters to GPSS transactions during simulation model execution. Six other subroutines, mostly written in IBM System/370 Assembly Language, are used in the initialization phase of the simulation to link FORTM to the MAIN program and to provide an in-core read and write capability. Two additional assembly language subroutines and a FORTRAN subroutine are used during simulation of the airport landside. The first assembly language subroutine assigns the number of passenger bags to be retrieved by the deplaning passenger transaction and generates random numbers to simulate waiting times at the bag claim facility. The second subroutine performs the same function as ASSIGN and LOGIC blocks of GPSS, but is FORTRAN callable. The FORTRAN subroutine of this group detects argument errors of the previous subroutine and prints error messages.

PAT-APPL-6-363 349 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Aircraft Loading Adapter for Use with Ordnance Lift Vehicle.
Patent Application,
Vernon E. Renfro, Ronald L. Gudgeon, John P. Clelland, and Clyde C. Cole. Filed 29 Mar 82, 12p AD-D009 563/8
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The patent application describes an adapter for use with lift forks or the like of a lift truck to allow very accurate positioning of ordnance and the like for attachment to aircraft. The adapter comprises a base which is supported or secured to the lift forks and includes an ordnance load carrying cradle means carried on a trolley mechanism that allows degress of freedom in the fore/aft and lateral directions. (Author)

PB82-250168 PC **A05**/MF **A01**
Wyle Labs./Wyle Research, Arlington, VA.
A Study of Soundproofing Requirements for Residences Adjacent to Commercial Airports.
Final rep381, 98p WR-81-39, EPA/550/9-82/328

As part of an overall systems program being conducted by the U.S. Environmental Protection Agency to examine options for the reduction of aircraft noise impact, this study was conducted to estimate the costs of soundproofing dwellings within the Ldn 65 noise contours at major U.S. commercial airports. The goal of the study is to achieve an interior sound level of Ldn 45 dB. The nation was divided into eleven regions, each one incorporating areas of similar dwelling construction. In this way, it was possible to specify the noise reduction of dwellings on a regional basis, taking local features into account. To determine the distribution of dwelling types in each region, and to obtain detailed information on local dwelling characteristics that affect noise reduction, field surveys were conducted at one airport in each region. The airports surveyed were selected on the basis that the local dwelling characteristics were representative of the respective region. The information obtained was used to identify the types of modifications most suitable for soundproofing dwellings in each region.

PB82-255076 PC **A06**/MF **A01**
Ducharme (Robert G.), Inc., Deerfield, IL.
Issues Related to Airport Noise in Illinois.
Final rept.,
Robert G. Ducharme. Apr 81, 125p IINR-81/16

The purpose of this report is to document the legal, economic and technical factors affecting noise abatement programs at Illinois airports; thus providing Illinois citizens with a complete description of the airport noise problem and possible solutions. The conclusions of the study should contribute to local, state and federal responses to the currently proposed airport noise regulation scheme.

2. AGRICULTURE

2B. Agricultural Economics

PB82-244476 PC **A04**/MF **A01**
Agricultural Projects Services Centre, Kathmandu (Nepal).
Rice Production in Nepal: Factors Affecting Adoption of Modern Varieties and Their Effect on Income and Income Distribution.
Research papers 11, 12, and 13,
Bharat B. Karki, Tilak Rawal, and John C. Flinn. Sep 81, 64p AID-PN-AAJ-877
Grant AID/ASIA-G-1199
Prepared in cooperation with Agricultural Development Council, Inc., New York.

Three short research reports are combined here to present a comprehensive examination of the introduction of modern rice varieties in Eastern Nepal. The titles of the three reports are: An Analysis of Factors Affecting the Adoption of Modern Varieties in Eastern Nepal; The Impact of Modern Varieties of Rice on Farm Income and Income Distribution in Eastern Nepal; and Rice Production in the Tarai of Kosi Zone, Nepal. All three reports are basically economic statistical studies. In the first report modern varieties were found to be higher yielding than local ones, and while total labor inputs were similar, the proportion of hired to total labor was significantly higher with modern varieties. Use of modern varieties yielded a higher net income for the farmers and led to use of more hired labor.

PB82-252826 PC **A10**/MF **A01**
Michigan Univ., Ann Arbor. Center for Research on Economic Development.
Livestock and Meat Marketing in West Africa. Volume I: Synthesis Upper Volta,
Edgar J. Ariza-Nino, Larry Herman, and Marty Makinen. 1980, 210p AID-PN-AAJ-212
See also Volume II, PB82-252834.
Also available in set of 5 reports PC E99, PB82-252818.

The prolonged Sahelian drought (1968-74) and the restructuring of international meat trade have made Sahelian meat producers wonder whether they will continue to dominate coastal West African markets. This report is the first of a five-part study of this market phenomenon. The report is in two parts. Part one synthesizes the findings of the study as a whole, e.g., characteristics of the coastal market and potential markets for Sahelian exports; addresses key issues, e.g., the structure of the livestock trade and the expanding world meat economy; and makes policy recommendations for the Sahelian and coastal countries.

PB82-253725 PC **A03**/MF **A01**
Illinois State Environmental Protection Agency, Springfield. Div. of Water Pollution Control.
Economic and Physical Impacts on Individual Farm Management Units Under Alternative Management Scenarios in the Blue Creek Watershed, Pike County, Illinois,
Thomas E. Davenport. Jul 82, 41p IEPA/WPC/82-005

This study is concerned with the effects of Resource Management Systems upon the annual net production value and soil erosion of individual land management units under three different management conditions. In comparison to the existing condition, the attainable and future scenarios exhibited five major trends in time. These five trends are: (1) an increase in the number of negative annual net production value land management units, (2) a significant increase in the number of land management units with conservation practices and some form of conservation tillage, (3) a slight increase in rotation length, (4) no major land use shifts between, and (5) a decrease in total erosion. ADAPT a geo-based computer mapping and planning system was used.

2C. Agricultural Engineering

PB82-255316 PC **A08**/MF **A01**
New Mexico Water Resources Research Inst., Las Cruces.
Demonstration of Irrigation Return Flow Water Quality Control in the Mesilla Valley, New Mexico.
Final rept.,
Robert R. Lansford, Peter J. Wierenga, Theodore W. Sammis, and Bobby J. Creel. Jun 82, 157p EPA-600/2-82-071
Grant EPA-S-803565

A 182-ha operating farm was used to demonstrate the water pollution control benefits of implementing improved irrigation management techniques and structures. The commodity crops produced on the farm included wheat, tomatoes, cotton, lettuce, peppers, chiles, grain sorghum, and alfalfa. Improved water management in furrow, sprinkle, and trickle irrigation methods were evaluated. Economic analyses of alternative management practices were made for Mesilla Valley based on results from the demonstration farm. The use of irrigation scheduling could reduce irrigation return flows by 30 to 36% and salt loading by 36,000-42,000 tons annually. A combination of irrigation scheduling, sprinkler irrigation for germination and furrow irrigation for production gave the highest net returns to land and risk of all combinations assessed.

PB82-255357 PC **A10**/MF **A01**
Washington State Univ., Pullman.
Controlling Sediment and Nutrient Losses from Pacific Northwest Irrigated Areas.
Final rept.,
B. L. McNeal, N. K. Whittlesey, and V. F. Obersinner. Jun 81, 206p EPA-600/2-81-090
Grant EPA-R-805037

General cropping pattern information has been assembled for major irrigated physiographic regions of Washington, Oregon, and Idaho, including irrigation system data and soil survey and land class information. Data have been assembled on physical factors leading to sediment and nutrient (phosphorus and nitrogen) losses from irrigated croplands, on methods of characterizing water application to and losses from such croplands, and on the economic techniques and/or factors for assessing the costs of selected pollution abatement practices. The report documents and compares many sources of information related to the estimation of sediment and nutrient losses. A method is proposed for measuring sediment (with associated phosphorus) and nitrogen losses from Pacific Northwest irrigated croplands.

2D. Agronomy and Horticulture

AD-A117 838/3 PC **A03**/MF **A01**
Cold Regions Research and Engineering Lab., Hanover, NH.
Effects of Inundation on Six Varieties of Turfgrass.
Special rept.,
Frederic H. Erbisch, and Karen L. Stark. May 82, 31p Rept no. CRREL-SR-82-12

Six cold-adapted grasses, (manchar brome, boreal red fescue, durar fescue, nugget Kentucky bluegrass, meadow foxtail and sydsport bluegrass) were given ten-day dark and inundation stress treatments. Nugget Kentucky bluegrass grown in soil or gravel exhibited the best survival. Sydsport bluegrass did well in gravel. Meadow foxtail and manchar brome survived the treatments when grown in silt soil, but did not when grown on gravel soil. Rhizomes were regenerated by most of the grasses. Root transverse sections did not show any stress-related damage, but leaf sections did. The damage in the sections paralleled that observed macroscopically. Electrophoretic analysis for the peroxidase enzyme complex showed significant banding pattern differences before external damage was visible. This technique may prove to be a diagnostic tool for determining stress damage. Seedlings of all grasses except sydsport bluegrass survived a 15-day inundation. (Author)

N82-27962/1 PC **A03**/MF **A01**
Agricultural Research Service, College Station, TX.
Predicting the Timing and Potential of the Spring Emergence of Overwintered Populations of Heliothis Spp.
Final Report, 1 Oct. 1980 - 31 Mar. 1981.
A. W. Hartstack, J. A. Witz, and J. D. Lopez. 31 Mar 81, 36p NASA-CR-167444, NAS 1.26:167444
NASA ORDER T-4629H

Current literature was reviewed in detail. Temperature and day length are the primary factors which program H. spp. larva for possible diapause. Mortality during diapause is reported as highly variable. The factors causing mortality are identified. Sufficient data was collected to allow the development of mathematical models which predict the timing of emergence. Timing predictions compare favorably to observed field data; however, prediction of actual numbers of emerging moths was not possible. The potential for use of spring emergence predictions in pest management applications, as an early warning of potential crop damage, are excellent. Research requirements to develop such an early warning system are discussed.

PB82-251414 PC **A06**/MF **A01**
Nebraska Univ.-Lincoln. Inst. of Agriculture and Natural Resources.
Genetic Improvement of Productivity and Nutritional Quality of Wheat.
Final rept. 1 Jul 66-31 Dec 79,
V. A. Johnson, and P. J. Mattern. Dec 80, 115p AID-PN-AAJ-327
Contract AID/ta-C-1093, Contract AID/csd-1208
See also PB-279 445.

Food to nourish the world's population, which will reach 6.5 billion by the year 2000, transcends all other problems confronting countries and governments. To help increase world food production, A.I.D. funded a research project to genetically engineer high protein wheat (HPW) at the University of Nebraska from 1966 to 1979. This final report summarizes the project's research findings. Analyses of 20,000 wheat cultivars showed that genetic variation for HPW of at least 5% exists in hexaploid wheat; genetic variation for lysine (LYS) amounts to only 0.5% LYS, as a percent of HPW, correlates negatively with HPW at protein levels up to 15%; and a strong positive correlation exists between LYS per unit weight and grain protein content. Major genes affecting grain HPW content were identified in Atlas 66 and Nap Hal. Genes modestly affecting LYS were found in CI13449 and Nap Hal. Hybridized genes were transferred to productive short-statured winter and spring wheats.

PB82-254046 PC **A25**/MF **A01**
Iowa Agricultural and Home Economics Experiment Station, Ames.
Field-to-Stream Transport of Agricultural Chemicals and Sediment in an Iowa Watershed. Part I: Data Base for Model Testing (1976-1978).
Final rept. Jul 75-Dec 79,
H. P. Johnson, and J. L. Baker. Apr 82, 577p EPA-600/3-82-032
Grant EPA-R-804102

Data on the field-to-stream transport of sediment and chemicals from an agricultural watershed were collected in a 3-year study to provide information for testing and evaluating mathematical models under development for predicting agricultural nonpoint source pollution. These models are prepared as tools to evaluate the effectiveness of different farm management practices in controlling losses of nutrients, pesticides, and sediment in field drainage to receiving waters. In the study, data were collected for small corn, soybean, and pasture fields; for two larger mixed-cover watersheds; and at three drainage-stream sites.

2F. Forestry

PB82-250531 PC **A02**/MF **A01**
Lockheed Engineering and Management Services Co., Inc., Houston, TX.

A Procedures Manual for Using High-Altitude Panoramic Photography for Forest Pest Damage Surveys.
Technical rept.,
R. D. Dillman, B. B. Eav, and S. S. Shen. Apr 82, 22p LEMSCO-17270, NFAP-269
Contract USDA/FS-53-3187-1-42

This document describes the procedures used in a large-area survey of ponderosa pine mortality caused by the mountain pine beetle. These procedures are based on the use of high-altitude panoramic photography as a means of sampling the study area. They can be modified, based on local conditions, for other types of natural resource surveys.

PB82-250838 PC **A03**/MF **A01**
Western Carolina Univ., Cullowhee, NC.
Man as a Factor in Southern Appalachian Bald Formation and Illustrations of Selected Sites Along the Blue Ridge Parkway in North Carolina.
Research/Resources Management rept.,
Garrett A. Smathers. 1982, 48p R/RM/SER-57

This report is one of a series that provides information on the origin and maintenance of grassy and heath balds along the Blue Ridge Parkway. It is presented in two parts: Part I, 'Man as a Factor in Southern Appalachian Bald Formation,' deals with the human factor, primarily European man, in the creation and maintenance of balds. Part II, 'Illustrations of Selected Sites along the Blue Ridge Parkway,' is a collection of photography depicting man's exploitation and extension of natural balds, as well as his removal of the high elevation forests for pasture and cropland.

PB82-251141 PC **E07**/MF **E07**
Oxford Univ. (England). Commonwealth Forestry Inst.
An Economic Analysis of Silvicultural Options for Broadleaved Woodland: Volume I,
S. N. Pryor. 1982, 131p CFI/OP-19-V1, ISBN-0-85074-041-X
Also pub. in ISSN-0141-8181. See also Volume 2, PB82-251158.

In July 1981 the Nature Conservancy Council (NCC) commissioned two reports making economic comparisons between the silvicultural options for broadleaf woodlands. The objectives are: To select and survey examples of agreed woodland types; to define and describe the silvicultural options available in each wood; to estimate the likely timber production, costs and income of each option in each wood; to compare the options available in each wood as investments and in terms of timber production.

PB82-251158 PC **E07**/MF **E07**
Oxford Univ. (England). Commonwealth Forestry Inst.
An Economic Analysis of Silvicultural Options for Broadleaved Woodland: Volume II,
R. Lorrain-Smith. 1982, 131p CFI/OP-19-V2, ISBN-0-85074-042-8
Also pub. in ISSN-0141-8181. See also Volume 1, PB82-251141.

The Nature Conservancy Council requires information on the economic performance of native British broadleaf woodland types. This report examines beech, sweet chestnut, coppice, coppice with standards, and Highland birch. The general approach adopted has been to calculate, for each woodland type, the profitability of possible silvicultural treatments, ranging from the purely commercial to the more strongly conservational, which can then be compared to provide a measure of the cost of conservation. The studies of the four woodland types have been based on case studies, but the applicability of the results has been greatly increased by sensitivity analyses in which many parameters have been independently varied to allow for local circumstances. The measure of profitability which has been used is net present value to infinity (NPV infinity), which can be calculated for any pattern of cash flow and allows the direct comparison of options with different rotation lengths.

PB82-251737 PC **A04**/MF **A01**
Lockheed Engineering and Management Services Co., Inc., Houston, TX.
Timber Typing on National Forest Lands with High Altitude Large Format Photography.
Final rept.,
J. F. Ward, and B. B. Eav. Dec 81, 58p LEMSCO-19612, NFAP-285
Contract USDA/FS-63-2783-3120

A land cover classification overlay of the Mancos District in the San Juan National Forest was made from large format high altitude aerial photography. The district encompasses all or parts of 12 quadrangle map sheets. The labeled polygons were transferred from the photographs to registered overlays. The Rampart Hills overlay will be used as a layer in the data base for the Multiresource Inventory Methods Pilot Test. The overall interpretation accuracy of the district was 78.2 percent with a 3.0 percent standard error. This project represents a demonstration milestone for extending the utility of high altitude, large format camera photography for timber management and forest planning.

PB82-251778 PC **A04**/MF **A01**
Lockheed Engineering and Management Services Co., Inc., Houston, TX.
Photointerpretation Guide for Identifying Pines Killed by the Mountain Pine Beetle.
Technical rept.,
R. D. Dillman, and W. B. White. Apr 82, 54p LEMSCO-16333, NFAP-267
Contract USDA/FS-53-3187-0-29

The photographic characteristics of two major host trees killed by the mountain pine beetle are illustrated in this guide. The two hosts are ponderosa pine (Pinus ponderosa) and lodgepole pine (Pinus contorta). These photographic characteristics have been developed from high-altitude panoramic aerial photography and are applicable throughout the insect's natural range in the Western United States.

PB82-252362 PC **A05**/MF **A01**
National Park Service, Atlanta, GA. Southeast Regional Office.
Physical, Chemical, and Bacteriological Characteristics of Stream in the Great Smoky Mountains National Park.
Research/Resources Management rept.,
David G. Silsbee, and Gary L. Larson. Jun 81, 95p R/RM/SER-47

Water samples from streams in Great Smoky Mountains National Park were analyzed for 16 physical, chemical, and bacteriological water quality parameters. Bacterial densities, pH, alkalinity, turbidity, and concentrations of Na, K, and Si were found to be higher in the high elevation samples. Watersheds which had been logged prior to the establishment of the park had significantly lower streamwater nitrate concentrations than unlogged watersheds in similiar elevations. Bedrock geology was found to influence pH, alkalinity, conductivity, hardness, and concentrations of Na, K, Ca, Mg, and Si. Seasonal variation in water quality and the reaction of streamwater quality to storms are also described. Stream channel characteristics were also analyzed in some streams.

PB82-252560 PC **A03**/MF **A01**
Western Carolina Univ., Cullowhee, NC.
The Biological Potential and Ecological Factors of Small Woodlot Ecosystems in North Carolina.
Research/Resources Management rept.,
Garrett A. Smathers. 1978, 37p R/RM/SER-35

This report presents a general descriptive analysis and evaluation of the biological potential and ecological factors of small woodlot ecosystems in North Carolina. North Carolina ranks fifth among the states in area of commercial timberlands. Over 245,000 small woodlot owners own eighty percent of the forestland, but these lands are producing only forty percent of their potential. Reforestation, good management, and selective cuttings are difficult to practice on small woodlots, especially when so many owners are involved.

PB82-252602 PC **A03**/MF **A01**
National Park Service, Atlanta, GA. Southeast Regional Office.
Some Ecosystem Responses to European Wild Boar Rooting in a Deciduous Forest.
Research/Resources Management rept.,
Francis J. Singer, Wayne T. Swank, and Edward E. C. Clebsch. Feb 82, 38p R/RM-54
Prepared in cooperation with Coweeta Hydrologic Lab., Otto, NC. and Tennessee Univ., Knoxville. Dept. of Botony.

The influence of rooting by European wild boar (Sus scrofa) upon surface fauna, nutrients and biomass of forest litter and soil was investigated in the northern hardwood forest of Great Smoky Mountains National Park, 1979-1980. Rooting by wild boar mixed A1 and A2 soil horizons and reduced ground vegetative cover and leaf litter. Two vertebrates that depend largely on leaf litter for habitat, the red-backed vole (Clethrionomys gapperi) and short-tailed shrew (Blarina brevicauda), were nearly eliminated from intensely rooted stands. Two other mammals and five salamanders that preferred more aboreal or subterranean habitats were unaffected by the rooting.

PB82-252636 PC **A03**/MF **A01**
National Park Service, Atlanta, GA. Southeast Regional Office.
Exotic Woody Plants of Shiloh National Military Park, Tennessee: A Population Survey of Aggressive Species.
Research/Resources Management rept.,
Teri Butler, and Peter S. White. Sep 81, 33p R/RM-51

The purpose of this study was to survey the established exotic woody plants at Shiloh National Military Park, Hardin County, Tennessee. This survey was part of a recent effort to assess the flora and vegetation at Shiloh. The study sought to document the population status of the most aggressive woody exotics. Woody species were chosen because they have the potential to be conspicuous, long-lived dominants in the Shiloh region.

PB82-253238 PC **E07**/MF **E07**
Commission of the European Communities, Luxembourg.
An Assessment of How the Forest Production Which is Currently Not Used Would Be Obtained for Energy Purposes and from This an Evaluation of the Management Methods Most Appropriate to the Production of Wood for Energy Purposes.
Final rept.,
G. H. King. c1981, 162p EUR-7550-EN
Customers in the European Community countries should apply to the Office for Official Publications of the European Communities, B.P. 1003, Luxembourg.

A general summary of the current methods for managing and utilizing wood resources for energy purposes in Great Britain is followed by detailed studies on: (1) wood residues from primary and secondary processing; their utilization and energy potential; (2) normal single-stemmed trees; management strategies for the production of whole-tree forest biomass, selection of species, planting and cropping rotation, ecological implications arising from land use, harvesting procedures, neglect of residues, transport and processing; (3) coppice trees as energy crops; factors affecting growth, selection of species, environmental factors, production and harvesting methods, costs and energy yield, the technical viability and potential for the development of coppicing techniques. (Copyright (c) ECSC-EEG-EAEC Brussels- Luxembourg 1981.)

PB82-255068 PC **A02**/MF **A01**
Intermountain Forest and Range Experiment Station, Ogden, UT.
Estimating Upslope Convective Windspeeds for Predicting Wildland Fire Behavior.
Forest Service research paper,
F. A. Albini, D. J. Latham, and R. G. Bauhman. Jul 82, 24p FSRP-INT-257

A mathematical model for the near-surface flow of air up a sun-heated slope is derived. The model is used to produce tables and graphs for estimating 'midflame' windspeeds as needed for predicting wildland fire behavior. The model applies on open or sparsely-forested slopes when there is otherwise no wind, from midday to late afternoon on clear summer days.

PB82-255118 PC **A04**/MF **A01**
National Park Service, Atlanta, GA. Southeast Regional Office.
Dispersal and Establishment of Red Spruce and Fraser Fir in Three Bald Areas of the Southern Appalachians.
Research/Resources Management rept.,
Joseph H. Sullivan, J. Dan Pittillo, and Garret A. Smathers. 1980, 60p R/RM/SER-41

No abstract available.

PB82-255274 PC **A03**/MF **A01**
National Park Service, Atlanta, GA. Southeast Regional Office.

Stand Analysis of an Invading Firetree ('Myrica faya' Alton) Population, Hawaii.
Research/Resources Management rept.,
Garret A. Smathers, and Donald E. Gardner. 1981, 30p R/RM/SER-42

The exotic firetree (Myrica faya) has been invading forest vegetation of Hawaii Volcanoes National Park since 1961. A population of ninety-six trees that had been invading a stand of native 'ohi'a trees Metrosideros collina was analyzed as to structure and fruiting characteristics. Preliminary findings show that the firetree invasion depends on an outside seed source. In addition, the mesic conditions beneath the 'ohi'a trees provide favorable habitat for seedling establishment.

3. ASTRONOMY AND ASTROPHYSICS

3B. Astrophysics

AD-A117 895/3 Not available NTIS
Stanford Univ., CA. Inst. for Plasma Research.
International Ultraviolet Explorer Observations of Hyades Stars,
Marie-Christine S. Zolcinski, Spiro K. Antiochos, Robert A. Stern, and Arthur B. C. Walker. 21 Sep 81, 9p
Contract N00014-75-C-0673, Grant NGL-05-020-272
Availability: Pub. in The Astrophysical Jnl. v258 p177-185, 1 Jul 82 (No copies furnished by DTIC/NTIS).

No abstract available.

DE82012715 PC **A02**/MF **A01**
Iowa State Univ., Ames.
Very-High-Energy gamma-Ray Astrophysics. Technical Progress Report, May 1981-March 1982.
R. C. Lamb. Mar 82, 11p DOE/ER/10774-2
Contract AC02-80ER10774

Our LSI/11 computer based data acquisition system was successfully tested in May and early June, 1981. The equipment was then moved to the JPL Edwards solar test facility for our observations of Cygnus X-3. Our first 10-day run in June-July demonstrated our compatibility with the solar research and confirmed our expectation that the site was adequately dark. Alignment of the mirrors was a greater technical obstacle than anticipated. By using night-sensitive television cameras mounted paraxially on each mirror, alignment to better than 0.1 exp 0 was eventually accomplished. In August-September a second 10-day run resulted in 53 hours of observation of Cygnus X-3 and 11 hours of the Crab Nebula. Emission from Cygnus X-3 was detected at the 4.4 sigma level of significance. (ERA citation 07:048300)

DE82701195 PC **A02**/MF **A01**
European Organization for Nuclear Research, Geneva (Switzerland).
Turbulent Diffusion and the Solar Neutrino Problem.
E. Schatzman. 18 Sep 81, 23p CERN-81-11
U.S. Sales Only.

This lecture presents a summary of the problem and includes the solutions found by Maeder and the author. The first part gives an outline of the structure of the Sun, especially the existence of a convective zone, and the different sources of energy, with predictions of the solar neutrino flux and earlier solutions of the solar neutrino problem. It is then shown how various kinds of instability existing inside rotating stars can generate a mild turbulence. A proof of the existence of this turbulence is looked for in the abundances of chemical elements at the surface of stars: abundances at variance with gravitational sorting; surface abundance of lithium and beryllium in the Sun; surface abundances of lithium in field stars; surface abundances of carbon isotopes in evolved stars. The last section shows that a turbulent diffusion coefficient D/sub T/ approx. equal to 0.1 Re/sub critical/, where Re/sub critical/ is the critical Reynolds number for which turbulence sets in, leads to a consistent solar model with a low neutrino flux. As a conclusion a comment is made on the gallium experiment, which can discriminate between the structural effects of the Sun and a possible neutrino oscillation. (Atomindex citation 13:657960)

DE82701432 MF **A01**
International Centre for Theoretical Physics, Trieste (Italy).
Doppiars SS433.
Jul 79, 7p IC-79/71
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

A new family of X-ray sources has recently been proposed including SS433. The general relativistic formula to fit the frequency dependence of Hsub(alpha) lines in SS433 as a function of the phase is presented here. Particularly relevant for the verification of the model are the observations at the phase of minimum shift. (Atomindex citation 13:660596)

DE82701433 MF **A01**
Science Research Council, Chilton (England). Rutherford and Appleton Labs.
First Three Years of IUE.
P. M. Gondhalekar, C. Jordan, and A. J. Meadows. Nov 81, 55p RL-81-091
U.S. Sales Only. Available in microfiche only.

The report is in sections, entitled: introduction (organization of IUE Satellite project; summary of highlights); highlights; active galaxies (Non-Seyfert; Seyfert; BL Lac objects; quasars); normal galaxies (objects in LMC; interstellar material in other galaxies; H II regions; nuclei of spiral galaxies; emission line galaxies); high energy objects (X-ray binary systems; novae); hot stars (including: Wolf-Rayet stars, planetary nebulae, novae); cool stars (including: main sequence stars, giants and supergiants, flare stars and other variable objects); interstellar medium; solar system. (Atomindex citation 13:660597)

DE82701434 PC **A03**/MF **A01**
Hiroshima Univ., Takehara (Japan). Research Inst. for Theoretical Physics.
Initial Behavior of a Quantized Scalar Field and the Associated Pair-Creation in Several Isotropic Closed and Open Universes.
H. Nariai. Jan 81, 31p RRK-81-1
U.S. Sales Only.

The concept of a positive frequency part near the initial epoch in a big-bang universe or its counterpart in another (say, de Sitter) one for a canonically quantized scalar field is important in discussing the associated pair-creation of those particles. Therefore, an attempt is made to define the positive frequency part in such isotropic closed and open universes that the scalar wave equation can be exactly solved. Except for some closed universe, the parts in question and, therefore, the Feynman propagators in the remaining universes are uniquely settled. Then it is shown that (1) the pair-creation in the Friedmann open universe (which is very interesting not only from observational, but also from theoretical viewpoints) is essentially equivalent to that in the Chitre-Hartle universe with flat 3-space and (2) the respective pair-creations in expanding metrics with open and flat 3-spaces of the de Sitter universe are different from each other, as insisted upon by Gibbons and Hawking basing on the original static metric. (Atomindex citation 13:660598)

DE82701435 PC **A02**/MF **A01**
Hiroshima Univ., Takehara (Japan). Research Inst. for Theoretical Physics.
Renormalized Energy-Momentum Tensor in a Robertson-Walker Universe.
T. Azuma. Mar 81, 17p RRK-81-6
U.S. Sales Only.

An expectation value of the energy-momentum tensor for a massive scalar field propagating in a Robertson-Walker universe is calculated by taking account of both effects caused by the particle creation and the vacuum polarization. It is shown that one part which is obtained by dividing the expectation value in terms of two kinds of vacuum states defined at initial and final stages of the expanding universe describes the particle creation at a later stage and another the vacuum polarization. A special case of the Chitre-Hartle universe which enables us to perform an explicit calculation is also treated. (Atomindex citation 13:660599)

N82-28229/4 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
X-Ray Spectra of the Crab Pulsar and Nebula.
S. H. Pravdo, and P. J. Serlemitsos. 1981, 20p
NASA-TM-84761, NAS 1.15:84761

The spectrum of the Crab pulsar was measued from 2 to 50 keV as a function of pulse phase and a progressive hardening and subsequent softening of the spectrum across the pulse was found. The fraction of the pulsed flux which exhibits spectral variability is 0.14 and is concentrated solely in the region between the two peaks. A model is suggested in which the pulsed X-ray emission from the Crab pulsar consists of two components: one which has no spectral dependence with pulse phase and which is physically related to the double peaked gama ray pulse and, perhaps, the radio and optical pulses; and another component which exhibits spectral variability with pulse phase is confined to and comprises the interpeak emission, and which is only seen at X-ray energies. These results and studies of the binary X-ray pulsar Hercules X-1 suggest a phenomonological similarity. If the spectrally varying component in the Crab pulsar arises from a hot, magnetized plasma near the neutron star surface then higher energy spectral observations of this phase region might reveal spectral features which can be used to determine the surface field strength.

N82-28234/4 PC **A03**/MF **A01**
Royal Inst. of Tech., Stockholm (Sweden). Institutionen foer Plasmafysik.
On Hierarchial Cosmology.
H. Alfen. 1982, 27p TRITA-EPP-82-03, ISSN-0348-7539
Prepared in Cooperation with California Univ., la Jolla.

The paradigm transition in cosmic plasma physics towards inhomogeneous models with features such as double layers, cell walls and filaments is discussed. A model ('Fireworks model') which accounts for the void region between the de Vaucouleurs (dV) and Laplace-Swarzchild limits is outlined. A hierarchical structure results from the explosion of a developing structure which reaches the dV limit. The explosion of this primary cloud, or protometagalaxy, causes metagalactic expansion. The largest fragments become protosuperclusters, which explode emitting protoclusters, which similarly form galaxies. Annihilation is a likely energy source for the explosions. In a cosmic cloud consisting of koinomatter and antimatter separated by Leidenfrost layers, a stationary equilibrium requires that n1/nS = VS/V1, where n1 is the density of the annihilation electrons, V1 their temperature in the Leidenfrost layer, and nS and n1 are the corresponding values in the slabs of matter. If VS becomes comarable to V1, the Leidenfrost layer cannot operate efficiently, so general annihilation, resulting in an explosion, occurs.

N82-28235/1 PC **A02**/MF **A01**
Texas Univ. at Austin. Marine Geophysics Lab.
Lunar Seismic Data Analysis.
Final Technical Report, Feb. 1978 - Jun. 1982.
Y. Nakamura, G. V. Latham, and H. J. Dorman. 30 Jun 82, 21p NASA-CR-169093, NAS 1.26:169093
Grant NSG-7418

The scientific data transmitted continuously from all ALSEP (Apollo Lunar Surface Experiment Package) stations on the Moon and recorded on instrumentation tapes at receiving stations distributed around the Earth were processed. The processing produced sets of computer-compatible digital tapes, from which various other data sets convenient for analysis were generated. The seismograms were read, various types of seismic events were classified; the detected events were cataloged.

4. ATMOSPHERIC SCIENCES

4A. Atmospheric Physics

AD-A117 389/7 PC **A02**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
The Cirrus and Sub-Visible Cirrus Background,
Arnold A. Barnes, Jr. 21 Jul 82, 8p AFGL-TR-82-0193, AFOSR-TR-82-0193
Pub. from Symposium on the Composition of the Non-urban Troposphere (2nd) Williamsburg, VA 25-28 May 82.

No abstract available.

AD-A117 412/7 PC **A03**/MF **A01**
Observatorio del Ebro Tortosa (Spain). Ionospheric Section.
Total Electron Content Lunar Variation at Two Mid-latitude Stations.
Interim scientific rept. 1 Sep 79-31 Aug 80,
L. F. Alberca, J. O. Cardus, and E. Galdon. 30 Oct 80, 28p SCIENTIFIC-8, EOARD-TR-80-16
Grant AFOSR-79-0114

Total electron content data of a year of the Ebro and Hamilton stations have been analyzed by the Chapman-Miller method and the components of the solar and lunar tides at both stations obtained. The same analysis has been performed with the data grouped by seasons. All results but the ones corresponding to Ebro equinoxes, are significant at the 5% level, and agree with results of other authors. The non-significance of the equinoxes results seems to be related to the location of the focus of the dynamo ionospheric currents. Also the semimonthly lunar tide and its diurnal solar variation are obtained and the results are discussed.

AD-A117 452/3 PC **A04**/MF **A01**
Ben-Gurion Univ. of the Negev, Sde Boker (Israel). Jacob Blaustein Inst. for Desert Research.
A Dynamical Model for Prediction of Formation, Growth and Dissipation of a Cloud.
Final Technical rept.,
Louis Berkofsky. 31 May 82, 71p
Grant DA-ERO-77-G-043

A dynamical model for the prediction of the life cycle of a desert cloud has been developed. The cloud is assumed to be a plume, i.e., to be contained within a cylindrical axi-symmetric volume. Thus, given ambient atmospheric conditions, and appropriate initial and boundary conditions, it is possible to predict the evolution as a function of height of a cloud. In all cases which we tested, the initial and ambient data were such that the life cycle never exceeded a few minutes. This is probably due to the fact that the data were compatible with a dry environment, thus preventing development. It is shown how this model may be interlaced with one for the larger scale circulation, thus providing the possiblity for the prediction of moisture convergence, necessary for cloud formation. (Author)

AD-A117 457/2 PC **A02**/MF **A01**
Washington Univ., Seattle. Dept. of Atmospheric Sciences.
Cloud and Precipitation Particle Size Spectra.
Final technical rept. 10 Oct 78-29 Apr 82,
Peter V. Hobbs. Jun 82, 9p ARO-15420.14-GS
Grant DAAG29-79-G-0005

Airborne measurements are described of the size distributions of cloud and precipitation particles in extratropical cyclones. Empirical expressions for the particle size distributions, and the effects of ambient conditions on these expressions, are described. The effects of the different size distributions on estimates of radar reflectivity and the mass content of cloud and precipitation particles are discussed. (Author)

AD-A117 497/8 PC **A06**/MF **A01**
JAYCOR, San Diego, CA.
Some Physical and Chemical Aspects of Striation Structure.
Interim rept. 1 Feb 79-15 Aug 80,
S. R. Goldman, and J. L. Sperling. 15 Aug 80, 116p DNA-5912Z, SBI-AD-E301 013
Contract DNA001-79-C-0050

In this report we assess a number of physical and chemical processes for their effect on striation structuring, with particular emphasis on times after a nuclear event, but prior to the re-establishment of the undisturbed ambient magnetic field. The results for charge exchange and impact ionization are particularly striking in that slow electron structure in the 100-200 km altitude range, due to fast ions created at an altitude of 400 km, exhibits a sharp decay with decreasing wavelength, at inverse wavenumbers below 20 kilometers.

AD-A117 659/3 PC **A04**/MF **A01**
Naval Research Lab., Washington, DC.
A Survey of Ionospheric Models A Preliminary Report on the Development of an Ionospheric Model Thesaurus and Users Guide.
Memorandum rept.,
J. M. Goodman, and E. O. Hulburt. 13 Jul 82, 62p
Rept no. NRL-MR-4830

This manuscript constitutes an interim progress report on an effort begun in early 1981 to compile a thesaurus and users guide for various ionospheric models which are used to assist in analysis of the radiowave propagation medium. The current status of the effort is given and future plans are outlined. (Author)

AD-A117 689/0 PC **A03**/MF **A01**
Observatorio del Ebro Tortosa (Spain). Ionospheric Section.
Lunar Variation of Several Ionospheric Parameters.
Interim scientific rept. 1 Sep 79-31 Aug 81,
L. F. Alberca, J. O. Cardus, and E. Galdon. 30 Sep 81, 35p SCIENTIFIC-2, EOARD-TR-82-12
Grant AFOSR-79-0114

The first four harmonics of the diurnal lunar variation and the semimonthly lunar tide of two years TEC data at Ebro and at Hamilton, and for some other ionospheric parameters at Ebro have been obtained. For the parameters with sufficient number of data, the lunar harmonics for the different seasons have also been obtained. The relation between the diurnal lunar variation of the height and the electron density of the maximum of the F2 layer seems to be solar dependent with a change of the phase at about 1000 SLT. The diurnal solar variation of the semimonthly lunar tide is also discussed. (Author)

AD-A117 836/7 PC **A03**/MF **A01**
BDM Corp., Monterey, CA.
Factors Relating Surface Visibility to the Total Optical Depth in the Marine Regime.
Contractor rept. 15 Apr-30 Sep 82,
C. W. Fairall. May 82, 31p NPS-63-82-004CR
Contract N00014-82-C-0251

This report describes some preliminary results of an effort to relate total aerosol optical depth at visible wavelengths to the visibility in the marine boundary layer (MBL). We present an atmospheric model which explains the observed height dependence of the aerosol extinction, examine aircraft and ship data from the MAGAT experiment, illustrate the influence of synoptic scale weather patterns on aerosol structure and present a simple model to relate alpha to total vertical depth. The ultimate goal of the project is to allow an estimation of IR ranges (due primarily to atmospheric water vapor density, Q) from satellite remote sensing data. A feasibility study on the concept was performed on two NPS data sets. (Author)

AD-A117 908/4 PC **A02**/MF **A01**
Naval Research Lab., Washington, DC.
Effect of an Electron Beam on the Current Convective Instability,
P. K. Chaturvedi, and S. L. Ossakow. 23 Jul 82, 18p
Rept no. NRL-MR-4858

We consider the possible effects of an electron beam on the current convective instability in a weakly ionized plasma, with application to the diffuse auroral-like situation. A linear instability analysis including these effects is presented. (Author)

N82-28006/6 PC **A03**/MF **A01**
National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
Documentation of the Computer Program CU-3D for the Three Dimensional Single Cloud Model.
M. K. Yau. Sep 81, 34p CSIR-SWISK-26, ISBN-0-798802222-8

The computer program CU-3D is a three dimensional single cloud cumulus model including warm rain and simple ice physics. The various subroutines and the input data used to start the run are described. The equations governing the dynamics and the microphysical processes are also included.

N82-28232/8 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Midlatitude pi2 Pulsations: AFGL and ISEE Magnetometer Observations Correlated.
W. J. Hughes, H. J. Singer, and N. C. Maynard. 1982, 10p NASA-TM-84763, NAS 1.15:84763
Grant NSG-5407

The ISEE observations of the pi2 magnetic pulsations occuring substorm onset in the inner magnetosphere are discussed. One of these events which was also detected as a pi2 event by the AFGL midlatitude magnetometers is considered. The event occurred when the foot of the ISEE field line was over North America. The ground and satellite signals are remarkably similar: they start and stop at the same time, have the same period and can be correlated cycle by cycle. The waves are detected in the electric field data from ISEE 1 and in the magnetic field data from both ISEE 1 and ISEE 2. Calculation of the Poynting vector at ISEE 1 shows that the energy flowed mainly westward, but that there was also a component towards the nearer (southern) ionospheric foot of the field line. The phases between the various field components measured by ISEE 1 and 2 indicate that this is a standing hydromagnetic oscillation.

PB82-253113 PC **A12**/MF **A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Environmental Research Labs.
Proceedings of a Workshop on Satellite Drag at Boulder, Colorado on March 18-19, 1982.
May 82, 264p NOAA-82070204

The genesis of this workshop was the realization that the Space Environment Services Center was not adequately meeting the needs of an important class of 'customers'--those operational units adversely affected by solar-induced fluctuations in the neutral atmospheric density at high altitudes. These customers use observed and predicted sunspot numbers, 10.7-cm solar flux values, and the geomagnetic K and A indices as inputs to calculate model neutral atmospheres at the appropriate satellite altitudes. These models are largely empirical, and especially during times of disturbed magnetic conditions operational tolerances for expected satellite drag are exceeded. A formal workshop was suggested as offering the best opportunity to increase understanding of satellite drag. The workshop consisted of discussions on: The Operational Problems of Satellite Drag; Atmospheric Density Models; Model Inputs and Indexes, Existing and Proposed; and Thermospheric Models and their Applicability of Real-Time Satellite Drag Problems.

4B. Meteorology

AD-A117 447/3 PC **A08**/MF **A01**
National Weather Service, Silver Spring, MD.
Automated Low-Cost Weather Observation System (ALWOS).
Final rept.,
Wayne Huffman, and Stephen Imbembo. Feb 82, 164p DOT/FAA/RD-82/31
See also AD-A072 119.

One of the primary objectives of this program was to design a developmental model ALWOS for the lowest possible cost. Reliability and maintenance costs over the life of the system were considered in addition to the initial purchase and installation costs. To this end, field proven, off the shelf components were used wherever possible throughout the system. Another primary objective was modularity of design. The hard-

ware and software were constructed to allow flexibility in interfacing a variety of sensors or adding additional sensors to measure new parameters. The ALWOS as configured at Dulles Airport is a low-cost and flexible system which can provide an automatic weather observation from the data acquisition, processing and display point of view, with the potential for good long-term system reliability. After a period of familiarization with the equipment and dealing with an assortment of system and sensor problems, the functioning of the system became relatively trouble-free. Evaluation of the ALWOS supports the generally accepted concept that automated, low-cost weather observation systems can indeed perform such a function given suitable sensing devices. (Author)

AD-A117 539/7 PC **A08**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Typhoon Motion Forecasting Using Empirical Orthogonal Function Analysis of the Synoptic Forcing.
Master's thesis,
Alan R. Shaffer. Mar 82, 151p

Empirical Orthogonal Function (EOF) analysis is used to describe the synoptic forcing features of selected northwestern Pacific Ocean tropical cyclones from 1967 to 1976. EOF analysis is applied to the geopotential field at 850, 700 and 500mb on a 120 point grid with 5 degree latitude and longitude spacing that is centered on the storm. The 120 EOF coefficients (for each level) are computed for a sample of 454 cases in the history file. The coefficient vectors are truncated to the first 10 coefficients, based on the Monte Carlo selection criteria of Preisendorfer and Barnett. These coefficients describe about 85% of the variance in the fields. The synoptic forcing represented by the EOF coefficients is then used as a predictor in a regression analysis track forecast scheme, along with past storm movement and intensity during the past 36 hours. The EOF-based regression equations are verified over an independent sample of 50 storms, and the position errors compared to the official Joint Typhoon Warning Center (JTWC) forecast errors. The EOF-based regression equations give, on the average, a 17% reduction in error when compared to the official forecast issued by JTWC. Over the independent sample, the 500mb equations performed better than the equations of the other two levels.

AD-A117 570/2 PC **A04**/MF **A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
Methods and Techniques of Experimental Research on the Atmosphere (Selected Articles),
R. I. Bogdanov, A. A. Vorontsov, Yu A. Glagolev, B. P. Zaychikov, and M. V. Krechmer. 18 Jun 82, 56p
Rept no. FTD-ID(RS)T-0682-82
Unedited machine trans. of Trudy Tsentral'noy Aerologicheskoy Observatorii, Metody i Tekhnika Eksperimental'nykh Issledovaniy Atmosfery (USSR) n102 p3-23, p139-140 1971.

No abstract available.

AD-A117 683/3 PC **A04**/MF **A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS. Hydraulics Lab.
Objective Specification of Atlantic Ocean Wind Fields from Historical Data.
Final rept.,
D. T. Resio, C. L. Vincent, and W. D. Corson. May 82, 55p Rept no. WES/WIS-4

An integral part of the Wave Information Study's effort to hindcast 20 years of waves for U.S. coastlines is the reconstruction of surface wind fields from available historical meteorological data. This report presents the methodology utilized for the estimation of surface winds from pressure fields, air and sea-surface temperature fields, and observed winds from ships. A critical element in the evaluation of a numerical study such as this is an analysis of the estimated error characteristics of the results. Extensive comparisons between observed and predicted winds are presented in the report. Without exception, these comparisons indicate that the statistical characteristics of the estimated winds provide a close approximation to those of the observed winds. (Author)

AD-A117 778/1 PC **A02**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
Automation of Visual Weather Observations,
H. Albert Brown. 1981, 8p Rept no. AFGL-TR-82-0199
Pub. in Proceedings of the International Conference on the Aviation Weather System, n1 p115-120, 4-6 May 81, Montreal, Canada.

No abstract available.

AD-A117 779/9 PC **A02**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
Development and Test of a Tactical Visibility Sensor,
Eugene Y. Moroz. 1981, 5p Rept no. AFGL-TR-82-0196
Pub. in Proceedings of the International Conference on the Aviation Weather System, n1 p125-127, 4-6 May 81, Montreal, Canada.

No abstract available.

AD-A117 799/7 PC **A02**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
Seeding Tests on Supercooled Stratus Using Vertical Fall Pyrotechnics,
Joe L. Sutherland, John R. Thompson, Don A. Griffith, and Bruce Kunkel. 4 Aug 81, 5p Rept no. AFGL-TR-82-0194
Pub. in Jnl. of Applied Meteorology, v21 n2 p248-251 Feb 82.

No abstract available.

AD-A117 818/5 Not available NTIS
Stanford Univ., CA. Edward L. Ginzton Lab. of Physics.
Simultaneous Remote Measurements of Atmospheric Temperature and Humidity Using a Continuously Tunable IR Lidar,
M. Endemann, and R. L. Byer. 2 Feb 81, 8p ARO-15278.13-PH
Grant DAAG29-77-G-0221
Availability: Pub. in Applied Optics, v20 n18 p3211-3217, 15 Sep 81 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A117 825/0 PC **A02**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
A Modular Automated Approach to Airfield Weather Systems,
Donald A. Chisholm, Richard H. Lynch, and James C. Weyman. 1981, 6p Rept no. AFGL-TR-82-0198
Pub. in Proceedings of the International Conference on the Aviation Weather System, n1 p69-72, 4-6 May 81, Montreal, Canada.

No abstract available.

N82-27706/2 PC **A12**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Abstracts of Papers Presented at the Eleventh International Laser Radar Conference.
Jun 82, 267p L-15380, NAS1.55:2228, NASA-CP-2228
Conf. Held at Madison, Wisc., 21-25 Jun. 1982; Sponsored in Part by Wisconsin Univ., AM. Meteorol. Soc., AFOSR, and Air Force Geophys. Lab.

Abstracts of 39 papers discuss measurements of properties from the Earth's ocean surface to the mesosphere, made with techniques ranging from elastic and inelastic scattering to Doppler shifts and differential absorption. Topics covered include: (1) middle atmospheric measurements; (2) meteorological parameters: temperature, density, humidity; (3) trace gases by Raman and DIAL techniques; (4) techniques and technology; (5) plume dispersion; (6) boundary layer dynamics; (7) wind measurements; visibility and aerosol properties; and (9) multiple scattering, clouds, and hydrometers.

N82-27912/6 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Results on the Verification of Satellite Data Based on a Comparison with Radiosonde Data.
G. Steinhorst. Mar 82, 8p NASA-TM-76691, NAS 1.15:76691
Contract NASW-3541
Transl. Into English from Ann. Der Meteorologie (Germany, F.R.), No. 15, 1980 p 185-186.

Results of the verification of satellite wind data are represented by comparing them with radiosonde data for the geostationary satellites METEOSAT, GOES and GMS. The quality of METEOSAT pictures improved, reaching the quality of GOES and GMT wind data.

N82-27913/4 PC **A04**/MF **A01**
National Aeronautics and Space Administration, Huntsville, AL. George C. Marshall Space Flight Center.
Atmospheric Environment for Space Shuttle (STS-3) Launch.
D. L. Johnson, S. C. Brown, and G. W. Batts. Apr 82, 51p NASA-TM-82480, NAS 1.15:82480

Selected atmospheric conditions observed near Space Shuttle STS-3 launch time on March 22, 1982, at Kennedy Space Center, Florida are summarized. Values of ambient pressure, temperature, moisture, ground winds, visual observations (cloud), and winds aloft are included. The sequence of prelaunch Jimsphere measured vertical wind profiles and the wind and thermodynamic parameters measured at the surface and aloft in the SRB descent/impact ocean area are presented. Final meteorological tapes, which consist of wind and thermodynamic parameters versus altitude, for STS-3 vehicle ascent and SRB descent were constructed. The STS-3 ascent meteorological data tape is constructed.

N82-27947/2 PC **A11**/MF **A01**
Danish Meteorological Inst., Copenhagen.
The Climate of Denmark. Summaries of Observations from Light Vessels. Part 2: Waves and Currents at the Surface.
A. Sparre. 1982, 228p DMI-CLIMATOL-PAPERS, ISBN-87-7478-197-9

Standard observations carried out in the waters around Denmark are presented as monthly tables. Data include highest wave heights, cumulative percentage frequency of wave heights, and means of wave heights at different wind directions and forces. Current velocities with annual and monthly vector means are given as are highest monthly recorded current velocities.

PB82-242769 PC **A04**/MF **A01**
National Oceanic and Atmospheric Administration, Miami, FL. Atlantic Oceanographic and Meteorological Labs.
The Structure of Typhoon Irma (1974) as Revealed by 700-mb Aircraft Data.
Technical rept.,
David P. Jorgensen. Apr 82, 64p NOAA-TR-ERL-418-AOML-32, NOAA-82062503

Instrumented-aircraft data for five days representing, roughly, the entire life cycle of the typhoon are analyzed. The data analyses are presented as horizontal cross sections and profiles of eight meteorological parameters: relative tangential wind, actual and relative radial wind, adjusted temperature, relative humidity, mixing ratio, adjusted D-value, and adjusted equivalent potential temperature.

PB82-250978 PC **A07**/MF **A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Environmental Research Labs.
Environmental Research Laboratories Programs 1981 and Plans 1982.
Annual rept.
Dec 81, 129p NOAA-82070205
See also report for 1980-81, PB82-224296.

The highlights of the Environmental Research Laboratories' accomplishments are presented with abbreviated summaries of immediate objectives. Each of the laboratories and program offices present their own summaries.

PB82-252578 PC **A03**/MF **A01**
National Park Service, Atlanta, GA. Southeast Regional Office.
Remote Sensing of Water Quality and Weather in Great Smoky Mountains National Park: Phase I.
Research/Resources Management rept.,
Raymond E. Burge, Raymond Herrmann, and Raymond C. Matthews, Jr. Mar 79, 30p R/RM-30

Four self-contained Convertible Data Collection Platforms (CDCP's) have been developed and deployed as an integral part of a comprehensive water quality and environmental monitoring program for remote natural areas at Great Smoky Mountains National Park. Multiple parameter sensor packages regularly monitor (1) water quality parameters (dissolved oxygen, hydrogen ion concentration (pH), oxygen reduction potential, conductivity, and temperature) and (2) meteorological parameters (wind direction and speed, ambient

temperature, relative humidity, barometric pressure and cumulative precipitation). The monitoring system is comprised of the multi-parameter sensor packages, the CDCP unit, a transmitting antenna, and a power source.

PB82-252727 PC **A09**/MF **A01**
Colorado State Univ., Fort Collins. Dept. of Atmospheric Science.
Tropical Cyclone and Related Meteorological Data Sets Available at CSU and Their Utilization,
W. M. Gray, E. Buzzell, and G. Burton. Feb 82, 192p
Sponsored in part by National Science Foundation, Washington, DC., National Oceanic and Atmospheric Administration, Washington, DC., Office of Naval Research, Washington, DC., and Naval Environmental Prediction Research Facility, Monterey, CA.

This report has been prepared to familiarize the international meteorological community with the comprehensive collection of tropical cyclone and other meteorological data which are available on our research project. The authors provide a rationale for the research philosophy behind the assembling of these data sets over the last decade, describe the data and indicate how other researchers may use them for their own research purposes. In particular, the authors summarize the rawindsonde compositing philosophy and the other research techniques employed on the project.

PB82-253089 PC **A02**/MF **A01**
National Weather Service, Salt Lake City, UT. Western Region.
Approximations to the Peak Surface Wind Gusts from Desert Thunderstorms.
Technical memo.,
Darryl Randerson. Jun 82, 25p NOAA-TM-NWS-WR-176, NOAA-82071903

Simple procedures for estimating the peak surface wind gusts from desert thunderstorms are proposed. The fundamental assumption is that the peak surface wind gust is related to the difference (Delta T) between the maximum ambient air temperature attained prior to the thunderstorm and the minimum temperature of the cooler air generated by the thunderstorm downdraft. A total of 49 independent cases are analyzed statistically. Six different regression equations are developed.

PB82-254509 PC **E03**/MF **E03**
Commission of the European Communities, Luxembourg.
Experimental Determination of the Atmospheric Dispersion Parameters: Experiment Performed July 2nd 1980 at the Karlsruhe Nuclear Research Centre,
H. Schuettelkopf, P. Thomas, S. Vogt, M. De Bortoli, and P. Gaglione. c1981, 46p EUR-7577-EN
Customers in the European Community countries should apply to the Office for Official Publications of the European Communities, B.P. 1003, Luxembourg.

A common atmospheric diffusion experiment was performed by the Joint Research Centre (JRC) Ispra and the Karlsruhe Nuclear Research Centre (KNRC) at the site of KNRC. CFCl3, CF2Br2 and SF6 were released simultaneously as tracers from the 160 m and 195 m platforms of the meteorological tower. Near ground sampling was performed at up to 67 positions at downwind source distances between 500 m and 8.5 km during two periods of 30 min each. Compared with earlier experiments at KNRC, the vertical dispersion parameters are in good agreement, while the horizontal dispersion parameters are smaller due to the smaller frequency distribution of wind direction during the experiment.

5. BEHAVIORAL AND SOCIAL SCIENCES

5A. Administration and Management

AD-A117 559/5 PC **A04**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Application of Selected Software Cost Estimating Models to a Tactical Communications Switching System: Tentative Analysis of Model Applicability to an Ongoing Development Program.
Master's thesis,
William B. Collins. Mar 82, 55p

This study analyzes the applicability of software cost estimating models to be a tactical information processing system. In particular, the Boehm and Putnam models are used to obtain predictions which are compared to contractor estimates for the TRI-TAC- AN/TTC-42 Unit Level Circuit Switch. Factors affecting model performance are also examined. (Author)

AD-A117 612/2 PC **A07**/MF **A01**
Naval Postgraduate School, Monterey, CA.
An Apple II Implementation of Man-Mod Manpower Planning Model.
Master's thesis,
James Lee Downs, II. Mar 82, 144p

This thesis presents an Apple II Markov chain model software package programmed to be flexible, practical, and user interactive. The program addresses the future determination of manpower requirements by an application of a limited Markov chain model, a discrete Markov process with a stochastic matrix of transition probabilities. The user may manipulate data inputs to vary outcome effects. The program was written in Applesoft, and Apple II basic language. It has the capability to store, retrieve, and modify data for use with the calculation procedures. The program can be easily modified or enhanced to allow for inclusion or utilization of other models. (Author)

AD-A117 911/8 PC **A09**/MF **A01**
RAND Corp., Santa Monica, CA.
The Use of Prototypes in Weapon System Development.
Interim rept.,
G. K. Smith, A. A. Barbour, T. L. McNaugher, M. D. Rich, and W. L. Stanley. Mar 81, 197p Rept no. RAND/R-2345-AF
Contract F49620-81-C-0018

This study examines the role of prototypes in the contemporary environment of weapon system acquisition. The research draws on case studies of four systems (two Air Force airplanes and two Army helicopters) that were developed in the early 1970s and that used prototypes in various ways. These were compared with a broad range of acquisition programs that used other acquisition strategies. The objective of this study is to sharpen the understanding of advantages and disadvantages of prototyping and conditions under which its use may be advantageous. Section II presents an outline of the different kinds of prototypes, and the various objectives that might be sought in a prototype phase. The section concludes with a description of the analysis procedure, a summary of the four systems examined, and the source of data on nonprototype programs used for comparison. Section III summarizes the results of the research, and Section IV contains the conclusions. Four appendixes are attached, each describing one of the case studies. (Author)

AD-A117 930/8 PC **A02**/MF **A01**
General Accounting Office, Washington, DC. Procurement, Logistics, and Readiness Div.
The Air Force Needs to Exercise More Control Over Equipment Authorizations.
27 Jul 82, 24p Rept no. GAO/PLRD-82-100
Report to the Secretary of the Air Force.

The Air Force's support equipment inventory is enormous in both size and importance. In October 1981 Air Force units had nearly $14 billion invested in radios, generators, vehicles, and the thousands of other equipment items needed to operate and maintain the Air Force installations and major weapon systems. Accurately identifying the equipment these units need is an awesome but essential task if the Air Force is to operate effectively: this information is necessary to prepare budget requests and procurement plans, and to use as a basis for equipping individual units. If equipment needs are not accurately identified, the Air Force may waste millions of dollars acquiring and maintaining unneeded assets or, worse, shortages may prevent the Air Force from accomplishing its defense mission. The management system that the Air Force uses to identify equipment requirements is complex. Among other things, the system must forecast the support equipment needed for new weapons systems, assess the effect of organizational changes, and compute replacement factors for aging equipment. However, the process used to authorize equipment for individual units is the most important part of the system. It is during this process that requirements are established for each Air Force unit. (Author)

DE82005746 MF **A01**
Onyx Corp., Washington, DC.
Electric Rate Demonstration Conference: Papers and Proceedings.
1980, 354p CONF-8004196-
Contract AC01-79RG10070
Electric rate demonstration conference, Denver, CO, USA, 1 Apr 1980, Portions of document are illegible. Best available copy from document source. Available in microfiche only.

Twenty-two papers were presented at the meeting. A separate abstract was prepared for each paper. (ERA citation 07:047110)

DE82008701 MF **A01**
Drexel Univ., Philadelphia, PA. Dept. of Electricial Engineering.
Identification of Feasible Strategies in the Presence of Uncertainties for Planning and Operating Power Systems. Final Report.
R. Fischl. Sep 81, 74p DOE/ET/29115-3
Contract AS02-77ET29115
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

Research concerned with developing new techniques for planning and operating power systems is reported. Specifically, the identification of sets of feasible strategies which guarantee a specified level of reliability in the presence of uncertainties is discussed. The main effort has concentrated in two areas: steady-state security assessment and enhancement; and transmission expansion planning. A set-theoretic approach is used to define the set of feasible strategies and indices which measure the size of these sets. This report presents a summary of the results obtained, with emphasis on the transmission expansion planning problem that takes into account the uncertainties in the load forecast and generation operation. (ERA citation 07:047115)

DE82009660 PC **A02**/MF **A01**
Systems and Applied Sciences Corp., Riverdale, MD.
Quarterly Project Status Report, January-March 1982.
1982, 18p DOE/RG/10367-T10
Contract AC01-80RG10367

Progress is reported on Systems and Applied Sciences Corporation support to the Economic Regulation Administration (ERA) to implement ERA's information data base. The purposes stated in PURPA are to promote conservation of energy supplied by utilities, efficiency in use of utilities, and equitable rates for utility consumers. ERA is required to assist state regulatory authorities and nonregulated utilities in carrying out their PURPA responsibilities by implementing information dissemination activities. A detailed description of performance; a description/schedule chart of performance; and the work schedule for the next reporting period are discussed. (ERA citation 07:043874)

DE82012508 PC **A04**/MF **A01**
Department of Energy, Washington, DC. Office of Energy Research.
Assessment of the Basic Energy Sciences Program. Volume 1. Technical Report.
Mar 82, 55p DOE/ER-0123-V.1
Portions of document are illegible.

At the request of the Acting Director of Energy Research, an assessment was undertaken of the Office of Basic Energy Sciences (BES) program. Out of approximately 1200 active projects supported by BES, a randomly selected sample of 129 projects was reviewed by panels of scientific peers. The reviews were conducted by 40 separate panels with an average of four members per panel. The panels rated individual projects on the basis of quality of science, quality of the project team, and probable impact on the Department of Energy (DOE) mission. After discussions of the component ratings, an overall panel rating was formed.

DE82013245 PC **A06**/MF **A01**
Department of Energy, Washington, DC.
Assessment of the Basic Energy Sciences Program. Volume II. Appendices.
Mar 82, 102p DOE/ER-0123-V.2
Portions of document are illegible.
Microfiche only after original copies are exhausted.

A list of experts reviewing the Basic Energy Sciences (BES) program and their organizations are given. The assessment plan is explained; the program examined the following: quality of science being conducted in the program, quality of performers supported by the Basic Energy Sciences (BES) program, and the impact of the research on mission oriented needs. The intent of the assessment is to provide an indication of general status relative to these questions for the BES divisions. The approach to the assessment is described. The sampling plan which was used as a guide in determining the sample size and selecting the sample to evaluate the research program of the Office of Basic Energy Sciences are discussed. Special analyses were conducted on the dispersion of reviewers' ratings, the ratings of the lower funded projects, and the amount of time the principal investigator devoted to the project. These are presented in the final appendix together with histograms for individual rating variables for each program area. (ERA citation 07:043824)

N82-28206/2 PC **A04**/MF **A01**
Council for Scientific and Industrial Research, Pretoria (South Africa).
Mini-Seminar on Approaches to Productivity Improvement.
Aug 81, 70p ISBN-0-7988-2082-9

Management of administrative productivity is addressed. Improving productivity through routing and scheduling is discussed. Storage of merchandise is considered. Rationalization is considered. Management motivation is also considered.

PB82-251372 PC **A05**/MF **A01**
National Technical Information Service, Springfield, VA. Office of International Affairs.
Application of Modern Technology to International Development (AMTID) 1977,
David B. Shonyo. 1977, 99p AID-OST-77-2

Application of Modern Technology for International Development (AMTID) announces information available from NTIS that has been found to be most useful in developing countries by the end users of the information. From 1972 to 1975 it was published quarterly, and monthly after 1975. The reports announced in AMTID after 1978 are more appropriate technology reports, previous issues containing more high technology that could help solve development problems. Those after 1978 cover a more select set of topics, concentrating on alternative energy, agriculture and aquaculture, small businesses, and management and administration.

PB82-251380 PC **A06**/MF **A01**
National Technical Information Service, Springfield, VA. Office of International Affairs.
Application of Modern Technologies to International Development (AMTID) 1974-2,
David B. Shonyo. May 74, 125p AID-OST-74-2

Application of Modern Technology for International Development (AMTID) announces information available from NTIS that has been found to be most useful in developing countries by the end users of the information. From 1972 to 1975 it was published quarterly, and monthly after 1975. The reports announced in AMTID after 1978 are more appropriate technology reports, previous issues containing more high technology that could help solve development problems. Those after 1978 cover a more select set of topics, concentrating on alternative energy, agriculture and aquaculture, small businesses, and management and administration.

PB82-251406 PC **A07**/MF **A01**
National Technical Information Service, Springfield, VA. Office of International Affairs.
Application of Modern Technologies to International Development (AMTID) 1974-1,
David B. Shonyo. Feb 74, 135p AID-OST-74-1

Application of Modern Technology for International Development (AMTID) announces information available from NTIS that has been found to be most useful in developing countries by the end users of the information. From 1972 to 1975 it was published quarterly, and monthly after 1975. The reports announced in AMTID after 1978 are more appropriate technology reports, previous issues containing more high technology that could help solve development problems. Those after 1978 cover a more select set of topics, concentrating on alternative energy, agriculture and aquaculture, small businesses, and management and administration. Almost all the reports cited in AMTID as well as back issues of AMTID are available from NTIS.

PB82-253816 PC **A03**/MF **A01**
General Accounting Office, Washington, DC. Accounting and Financial Management Div.
Who Is Watching the Defense Dollars.
5 Feb 82, 47p GAO/AFMD-82-26

The Department of Defense does not have a statutory inspector general like those in other major Federal agencies. Instead, the Department has 18 organizations for auditing and investigating its internal operations and Defense contractors. The organizations operate separately and their responsibilities are fragmented among the military services and agencies. For example, the Army has its own internal auditors who are organizationally separate from the Navy and Air Force internal auditors. The Congress is considering legislation (H.R. 2098 and S. 1932) that would (1) establish a statutory Defense inspector general, (2) consolidate some of the existing Defense audit and investigative units, and (3) give them more independence and clout. GAO supports the concept of this legislation.

PB82-873381 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Small Businesses: Financial and Technical Assistance. 1971-August, 1982 (Citations from the NTIS Data Base).
Rept. for 1971-Aug 82.
Aug 82, 188p

This bibliography contains citations concerning assistance available to small business firms by local, state and federal governments. This includes assistance in management, finance, technoloy, loans, and various handbooks and guides on how to start and manage a small business, and how to do business with the federal government. Some citations relate to evaluations of these assistance programs, surveys on problems faced by small businesses that relate to government programs and regulations, and recommendations for improved assistance. While the major emphasis in this bibliography is on recent reports relating to assistance, some older but still valuable citations are retained, such as the Small Business Administration series on starting and managing small business firms. (Contains 169 citations fully indexed and including a title list.)

PB82-873514 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Small Businesses: Financial and Technical Assistance. 1975-August, 1982 (Citations from the Management Contents Data Base).
Rept. for 1975-Aug 82.
Aug 82, 134p

This bibliography contains citations concerning assistance available to small business firms by the banking community and by local, state and federal governments. This includes assistance in loans, financial and technical management, and discussions of problems faced by small business, with recommendations and case histories of some solutions. Some articles point out areas in the federal government that can be of help to the small business manager, even though many of these agencies are not specifically charged with small business support. (Contains 192 citations fully indexed and including a title list.)

5B. Documentation and Information Technology

AD-A117 398/8 PC **A02**/MF **A01**
Army Electronics Research and Development Command, White Sands Missile Range, NM. Atmospheric Sciences Lab.
Heuristic Information Processing as Implemented in Target Motion Resolution Analysis of Radar Data.
Conference paper,
John N. Hynes, and David S. Jimarez. 18 Jun 82, 14p
Paper from the Proceedings of the Army Sciences Conference (1982), 15-18 Jun 82.

The two new processes for MLRS (Multiple Lauch Rocket System) base and spin frequency tracking have made significant advances in the quality and speed with which data are produced for that project. Routine processing of these parameters can now be performed, using data technicians, in less than a tenth of the time formerly required by a trained analyst. While developed primarily for the MLRS, each process also has applicability to similar classes of targets, thus reducing later developmental efforts. In the future, developments in this area will continue, becoming more sophisticated and having wider applicability, helping to support the increasingly demanding test and evaluation needs of our new weapons systems.

AD-A117 489/5 PC **A03**/MF **A01**
Naval Health Research Center, San Diego, CA.
Specifications for a Navy Occupation Health Information Monitoring System (NOHIMS). II. A Functional Overview.
Interim rept.,
D. D. Beck, and W. M. Pugh. 19 Apr 82, 42p Rept no. NAVHLTHRSCHC-82-6

The objective of the Navy Occupational Health Information Monitoring System (NOHIMS) is to provide an information system that will coordinate the components of the Navy's occupationcl health program in order to meet the requirements of the Occupational Safety and Health Act of 1970. The present report develops in greater detail the design concepts introduced in an earlier report, providing more specific information on the content of the personnel, environmental, and medical databases contained in NOHIMS. In addition, an overview of the functional specifications for NOHIMS is presented.

AD-A117 644/5 PC **A20**/MF **A01**
Environmental Science and Engineering, Inc., Gainesville, FL.
Research and Development Services: Methods Development. Appendices.
Final rept. 24 Dec 80-24 Jul 82,
J. J. Mousa, D. H. Powell, R. E. Hall, A. L. Shroads, and J. W. Johnson. 23 Jul 82, 474p DRXTH-TE-CR-82165-APP
Appendices to AD-A117 643.

Contents: Appendix A - Literature Search Abstracts; Appendix B - Project Quality Control Plan; Appendix C - Computer Program for Reduction of HPLC Screen Data; and Appendix D - Analytical Methods.

AD-A117 715/3 PC **A17**/MF **A01**
North Atlantic Treaty Organization. Military Agency for Standardization.
NATO Glossary of Terms and Definitions (English and French) (Glossaire OTAN de Termes et Definitions (Anglais et Francais)).
Edition P, 1982.
10 Feb 82, 397p Rept no. AAP-6(P)
Text in English and French.

Definitions of terms used in, or associated with the military are provided in both English and French listings. (Author)

AD-A117 719/5 PC **A02**/MF **A01**
Navy Personnel Research and Development Center, San Diego, CA.

A System for Assessing User Response to NAVPERSRANDCEN RDT&E Products.
Final rept. Oct 81-Mar 82,
Harold H. Rosen. Jun 82, 20p Rept no. NPRDC-SR-82-29

NAVPERSRANDCEN has developed a user-oriented system for assessing user response to Center products. In this system, a report on a Center product and an evaluation request are mailed to previously identified users for appropriate action. Results indicate that the system has great potential for initiating and maintaining a productive dialogue between researchers and operational consumers. Data provided can be used to improve the quality of R&D management decisions by offering both long-term trend information and immediate feedback regarding product utilization. (Author)

AD-A117 766/6 PC **A03**/MF **A01**
Office of Naval Research, London (England).
European Scientific Notes. Volume 36, Number 6,
Donald R. Barr, and Don J. Peters. 30 Jun 82, 30p Rept no. ESN-36-6
See also Volume 36, Number 5, AD-A116 946.

This is a monthly publication presenting brief articles concerning recent developments in European Scientific Research. It is hoped that these articles (which do not constitute part of the Scientific Literature) may prove of value to American scientists by calling attention to current developments and to institutions and individuals engaged in these scientific efforts. The articles are written primarily by members of the staff of ONRL and occasionally articles are prepared by, or in cooperation with members of the scientific staffs of the United States Air Force European Office of Aerospace Research and Development and the United States Army Research and Standardization Group. Articles are also contributed by visiting Stateside scientists. (Author)

AD-A117 830/0 PC **A10**/MF **A01**
Logistics Management Inst., Washington, DC.
Defense Energy Information System (DEIS): DEIS-80 Design System Specification. Revision B,
Joan Lengel. Jul 82, 212p
Contract MDA903-81-C-0253
See also the basic AD-A096 263 and Revision A July 81, AD104 016.

The Defense Energy Information System (DEIS) is a worldwide, automated, energy management information system. It provides data on petroleum products used as mobility fuels by the military departments as well as most energy sources used for utility services at DoD installations. DEIS consists of two related information systems. DESI I reports the disposition and consumption of petroleum products, notably aviation gasoline, jet fuels, motor gasoline, distillate and residual oils within DoD. DEIS II reports the consumption of utility energy, such as electricity, natural gas, purchased steam/hot water, fuel oil and coal. It reports the consumption and generation of energy from renewable sources. This document presents the System Specification for the enhanced DEIS (DEIS-80). As specified, DEIS-80 improves the utility of the existing system by including additional data, supporting management queries of the DEIS-80 data bases on-line, and providing the capability for automated data analysis.

AD-A117 940/7 PC **A02**/MF **A01**
Air Univ., Maxwell AFB, AL.
MISIL, Too Big to Fly.
Student rept.,
Rowena R. Lafferty. 1981, 17p

The establishment of the Management Information System, International Logistics integrated data base was accomplished at great expense of resources by the Navy. The goals of the system are to keep Navy financial and supply records compatible and accurate with a minimum of resources. With this idea I will demonstrate that these goals cannot be achieved without additional data base structural changes. My recommendation is one proposed course of action. (Author)

DE82010822 MF **A01**
Massachusetts Inst. of Tech., Cambridge. Energy Lab.
Evaluation of the Coal and Electric Utilities Model Documentation.
N. L. Goldman, M. J. Mason, and D. O. Wood. Mar 81, 241p MIT-EL-81-007
Contract AM01-76EI02295
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

The Energy Information Administration (EIA) is sponsoring a study of methods and procedures for the effective internal management and control of information model development, evaluation, and application in order to improve the quality and credibility of energy information developed and published by the EIA. This first report of the EMAP project is concerned with the development of procedures for planning and implementing effective documentation and presents the results of an MIT analysis of policy model documentation and EIA's approach to it. As a means both of facilitating the analysis and of illustrating its application in documentation evaluation, a case study is included of a particular energy model, the ICF Coal and Electric Utilities Model (CEUM). The analysis method, its application and the errors and problems identified in the documentation and implementation of the CEUM are discussed in detail. It is concluded that the documentation guidelines presently used by EIA are just that - guidelines. Applying these guidelines in evaluating the CEUM documentation has demonstrated that the actual scope and extent of successful documentation requires more active analysis and planning. Documentation requirements analysis should be an integral part of the model development planning process reflecting the interests and expectations of the modeler, model sponsor, client and/or users, and must be separately budgeted for both financial and skill requirements. It is recommended that EIA consider implementing such a procedure for all new modeling projects. (ERA citation 07:050548)

DE82701209 MF **A01**
International Atomic Energy Agency, Vienna (Austria). International Nuclear Data Committee.
Minutes of the Eleventh INDC Meeting Vienna, 16-20 June 1980.
S. Yiftah. Jul 81, 86p INDC-35/U, CONF-8006221-(Sum.)
11. international Nuclear Data Committee meeting, Vienna, Austria, 16 Jun 1980.
U.S. Sales Only. Available in microfiche only.

The International Nuclear Data Committee met at IAEA Headquarters, Vienna, for its eleventh meeting, on June 16-20, 1980. The meeting was attended by 13 committee members, 7 advisors and 15 observers from 15 countries and 3 international organizations. The Committee reviewed the nuclear data activities of the IAEA, in Member States and in Nuclear Data Centres during the 18 months since its last meeting in Bucharest, October 1978. The committee also discussed critically the nuclear data programmes for the next 18 months. The official Minutes include summaries of the discussions of the agenda items, full reports of subcommittees, list of actions, together with lists of participants and subcommittees membership. (Atomindex citation 13:658366)

DE82701210 MF **A01**
International Atomic Energy Agency, Vienna (Austria). International Nuclear Data Committee.
INDC/NEANDC Nuclear Standards File 1980 Version.
Sep 81, 118p INDC-36/LN
U.S. Sales Only. Available in microfiche only.

This working document of the Nuclear Standards Subcommittee of the International Nuclear Data Committee (INDC) summarizes the status of nuclear standards as of the 11th INDC meeting (6/'80) with selective updating to approximately 5/'81. This version of the file is presented in two sections as per the following. The first section (A) consists of numerical tabulations of the respective quantities generally including quantitative definition of the uncertainties. Most of these numerical values are taken from the ENDF/B-V file which is available on a world-wide basis through the 4-Center network. Some guidelines as to appropriate usage are also given. The objective is the provision of a concise and readily used reference guide to essential standard-nuclear quantities useful for a diversity of basic and applied endeavors. The second section (B) briefly summarizes the contemporary status of each of the standards tabulated in Section A and additional items, including recent relevant work and areas of continuing uncertainty. These brief reviews were prepared under the auspices of the Committee by outstanding specialists in the respective fields. In many instances they are new statements but, where review indicates that the previous statement (see INDC-30/L+sp) remains appropriate, the previous summaries were retained; often with additional remarks by the editor. (Atomindex citation 13:658367)

ED-200 217 Not available NTIS
Advisory Commission on Intergovernmental Relations, Washington, DC.
Federal Involvement in Libraries. The Federal Role in the Federal System: The Dynamics of Growth. Commission Report A-84.
Jun 80, 46p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210. Also available from Supt. of Docs.

One of seven studies prepared by the Advisory Commission on Intergovernmental Relations (ACIR) in its examination of the federal fiscal system, this study examines the allocation and coordination of federal resources among the various levels of government for the development of libraries and library services. Topics addressed include the federal, state, and local roles within their current and historical contexts; the limited role of federal involvement prior to 1956 and the passage of the Library Services Act in that year; the heyday of federal aid in the 1960s; conflicts between the President and Congress concerning library aid; the organizational issue of the struggle for a federal presence; an analysis of the political dynamics of federal involvement; and a brief discussion of the future of the federal role in libraries. Figures list major federal library legislation and the changing purposes in the public library system, and seven tables provide budgetary, appropriations, and expenditures information.

ED-200 218 Not available NTIS
Washington and Lee Univ., Lexington, VA.
Library Resources for College Scholars. Transactions of a Conference Held at Washington and Lee University, Lexington, Virginia, February 14-15,1980.
Robert E. Danford. Feb 80, 48p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

Convened by representatives of 15 private liberal arts colleges, this conference addressed the role and place of the library in the liberal arts college, the needs of academic users, and alternatives to current practices. A summary of the conference by William J. Watt and a list of participants is included.

ED-200 219 Not available NTIS
Library of Congress, Washington, DC. Network Development Office.
National Union Catalog Experience, Implications for Network Planning. Network Planning Paper No. 6,
Raymond F. Vondran. 1982, 64p ISBN-0-8444-0325-3.
Sponsored in part by National Commission on Libraries and Information Science, Washington, DC.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210. Also Customer Service Section, Cataloging Distribution Service, Library of Congress, Navy Yard Annex, Bldg. 159, Washington, DC 20541.

This study conducted to provide background data for the systematic development of the library bibliographic component of a national network analyzes the procedures used in producing the National Union Catalog (NUC), the nationwide union catalog in card form maintained at the Library of Congress (LC), and examines the variations found in records as they are integrated into the file. The report discusses NUC operations and workflow, characteristics of reporting libraries, differences in headings between outside reports to the NUC and LC records, and differences in bibliographic description between outside reports to the NUC and LC records. Conclusions for a nationwide database derived from the analysis of processes in the catalog publication division are presented along with recommendations for future investigation. Tables and figures are provided.

ED-200 220 Not available NTIS
BRS Mini-Manual: A Brief Guide to User Commands,
Kathryn L. King. 1980, 10p

Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

This abridged adaptation from the BRS System Reference Manual identifies and briefly explains the meanings and functions of the logical operators used to retrieve information from the BRS system.

ED-200 221 Not available NTIS
California Univ., Berkeley. Library Studies and Research Div.
Conservation and Preservation Programs for the University of California Libraries; Problems, Programs, and Costs,
Richard G. King. 7 Jan 79, 26p RR-80-2
For related documents, see IR 009 256-257.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210. Also University of California Systemwide Administration, Room 7, 2200 University Ave., Berkely, CA 94720 ($1.50).

Designed to provide background for the planning of collection preservation programs in the libraries of the University of California, this paper presents an overview of the preservation problem, makes specific recommendations for further programs within the University of California library system, and assesses the needs of the system with regard to: (1) environmental control within buildings housing collections, (2) training of conservation administrators and preservation specialists, (3) restoration of deteriorating collections, and (4) research into the causes and cures of paper deterioration. Estimated costs of a program addressing these four areas are given. A bibliography lists 37 references.

ED-200 222 Not available NTIS
California Univ., Berkeley. Library Studies and Research Div.
Environmental Control for Reginal Library Facilities,
Richard G. King, Jr. 25 Mar 80, 14p RR-80-3
For related documents, see IR 009 255-257.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210. Also available from University of California Systemwide Administration, Room 7, 2200 University Ave., Berkeley, CA 94720 ($1.25).

This report presents an overview of the damage to library materials caused by uncontrollable environmental variables. The control of atmospheric pollutants, temperature, and humidity are discussed with regard to damage, standards, and the costs of deterioration due to these factors. Twelve references are listed.

ED-200 223 Not available NTIS
California Univ., Berkeley. Library Studies and Research Div.
A Guide to the Literature on Deterioration, Conservation, and Preservation of Library Material,
Richard G. King, Jr. Nov 80, 18p RR-81-1
For related documents, see IR 009 255-256.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210. Also available from University of California Systemwide Administration, Room 7, 2200 University Ave., Berkeley, CA 94720 ($1.70).

This annotated, sometimes critical, bibliography is directed to those wishing to acquire a background in the conservation and preservation of library and archive materials. The bibliography lists general works, technical works, disaster planning literature, other preservation bibliographies, automated preservation information sources, periodicals containing articles on preservation, and miscellaneous sources of information. An evaluation of the bibliographic situation in the field of preservation is included.

ED-200 224 Not available NTIS
California Library Authority for Systems and Services, San Jose.
CULP (California Union List of Periodicals) 1980 User Survey Results. PN-77,
Karl M. Pearson. Jan 81, 12p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

This survey of California libraries was conducted to gather information on the use of the California Union List of Periodicals (CULP), a microfiche finding list for serials held in all kinds of libraries statewide, except for those held by major academic institutions. Returned by 391 of 696 libraries in October 1980, the survey questionnaire was designed to identify the market for CULP, the ways in which CULP is used, the degree to which it is used, user priorities for improving CULP, and the other union serials lists libraries are using. The report summarizes the findings for each question.

ED-200 233 Not available NTIS
Ohio State Library, Columbus.
A Planning Process for Automated Shared Circulation Systems,
Anthony G. Yankus. May 80, 8p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

An outline for librarians who want to cooperatively plan to implement a shared circulation system, this guide employs a method of planning based on policy analysis. The stages of problem formulation, identification of objectives, perceptual activity, system design, information gathering, and evaluation are outlined. Although this guide contains some examples of the types of information decision makers should consider, it does not provide detailed information about every aspect of the planning process.

ED-200 235 Not available NTIS
Kentucky Univ., Lexington. Univ. Libraries.
Technical Processing Librarians in the 1980's Current Trends and Future Forecasts,
Gail Kennedy. Aug 80, 13p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210. Pub in Jnl of University of Kentucky Libraries Occasional Papers, v1 n1 Aug 1980.

This review of recent and anticipated advances in library automation technology and methodology includes a review of the effects of OCLC, MARC formatting, AACR2, and increasing costs, as well as predictions of the impact on library technical processing of networking, expansion of automation, minicomputers, specialized reference services, and inilationary trends. Forcasts include an increase in technical qualifications for and a decrease in the number of technical processing librarians. Three references are listed.

ED-200 236 Not available NTIS
Northern Illinois Univ., De Kalb. Libraries.
Introducing the College-Bound Student to the Academic Library: A Case Study,
Lorraine A. Jean. Feb 81, 31p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

The academic library orientation workshops described are conducted by the University of Vermont to acquaint college bound high school seniors with the resources available in an academic library. Sessions consist of a location exercise in which students use the card catalog to locate specific materials, a guided tour of the library, and a written exercise using periodical indexes, the computer listing of periodicals, and the card catalog. Participating students and their teachers complete written evaluations which the library reference staff then uses to monitor the program's effectiveness. This study examines the evaluations from six sessions and offers suggestions for improvement. A sample reference exercise, sample titles for the location exercise and a reference exercise, sample titles for the location exercise and a reference exercise worksheet, and evaluation forms are included.

ED-200 237 Not available NTIS
Muskogee Public Library, OK.
Muskogee Community Analysis: A Study of the Community of Muskogee, Oklahoma, and the Muskogee Public Library with Recommendations for the Library,
Jeanette N. McQuitty. Aug 80, 127p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

To assist the public library in choosing between alternatives in the allocation of resources to satisfy library needs, this community analysis presents 44 recommendations for the improvement of library facilities, staffing, services, materials, funding, and public relations. The report provides a comprehensive view of Muskogee, its population, user needs, and the library, through an analysis of census studies, other community studies, library statistics, and samplings of the library collection. Chapters focus on the characteristics of the community, a neighborhood survey, library organization and resources, library services, and conclusions and recommendations; 25 tables, charts, and maps are included.

ED-200 238 Not available NTIS
California State Coll., Dominguez Hills.
Collection Development Policy for the University Library,
Louis Bell. Mar 80, 294p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

This policy statement for a university library covers goals and objectives of collection development, the sharing of resources, and the responsibilities of both teaching faculty and librarians in the collection development process, as well as general library policies and guidelines and selection policies in the various subject areas and university units. General policies deal with approval plans, duplicat copies, gifts and exchange, intellectural freedom, microforsm out-of-print and rare books, replacements, serials, and weeding. A general discussion of selection policies, which includes collecting levels, materials collected, and materials excluded, procedes descriptions of policies in specific subject areas; e.e., education, educational resources, humanities and fine arts, management, natural sciences and mathematics, and social and behavioral sciences. Each of these areas is divided into a number of subheadings. Also included are selection policies for Small College and University College, and a subject index.

N82-28213/8 PC **A07**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
A Review and Evaluation of the Langley Research Center's Scientific and Technical Information Program: Results of Phase 6: The Technical Report. A Survey and Analysis.
Final Report.
R. A. Mccullough, T. E. Pinelli, D. D. Pilley, and F. F. Stohrer. Apr 82, 136p NASA-TM-83269, NAS 1.15:83269

Current practice and usage using selected technical reports; literature relative to the sequential, language, and presentation components of technical reports; and NASA technical report publications standards are discussed. The effctiveness of the technical report as a product for information dissemination is considered.

N82-28218/7 PC **A02**/MF **A01**
Societe Nationale Industrielle Aerospatiale, Les Mureaux (France).
Text Processing in the Writing of Contracts le Traitement de Texte au Service de la Redaction des Contrats.
J. Bernard, and J. C. Muller. 1981, 9p SNIAS-821-422-105
Text in French. Presented at Conf. Burotica 81, Paris, 16 Jun. 1981.

Compilation problems encountered while drawing up contracts are discussed. Cut and paste methods were reviewed and tasks where EDP can be timesaving are identified. A text processing system is proposed. The system was implemented for a trial period of 15 months. Results are positive operationally, financially, and from a human factors point of view.

PB82-251554 PC **A06**/MF **A01**
National Technical Information Service, Springfield, VA. Office of International Affairs.
Aplicacion de Tecnologias Modernas al Desarollo Internacional (Application of Modern Technology to International Development) (AMTID),
John W. Hounsell, Paul Tuebner, and Carlos Izaguirre. 1979, 123p AID-OST-79-1-12
Text in Spanish.

Application of Modern Technology for International Development (AMTID) announces information available from NTIS that has been found to be most useful in developing countries by the end users of the information. From 1972 to 1975 it was published quarterly, and monthly after 1975. The reports announced in AMTID after 1978 are more appropriate technology reports,

previous issues containing more high technology that could help solve development problems. The order number and price of each title are given but the prices are out of date. Request a new NTIS price list before ordering any reports in this bulletin. Reports are also abstracted in AMTID after issue 1978-5. AMTID's prior to 1978 cite reports on all subjects. Those after 1978 cover a more select set of topics, concentrating on alternative energy, agriculture and aquaculture, small businesses, and management and administration. Almost all the reports cited in AMTID are available from NTIS. All back issues of AMTID are available from NTIS.

PB82-252883 PC **A05**/MF **A01**
National Technical Information Service, Springfield, VA. Office of International Affairs.
Aplicacion de Tecnologias Modernas al Desarollo Internacional (Appli cation of Modern Technology to International Development) (AMTID),
Jeanne Bogaert de Perez, Paul Tuebner, B. Gerardo Mirabelli, Suthep Visavakul, and Prithvi Haldea. 1980, 99p AID-OST-80-1-12-S
Text in Spanish.

Application of Modern Technology for International Development (AMTID) announces information available from NTIS that has been found to be most useful in developing countries by the end users of the information. From 1972 to 1975 it was published quarterly, and monthly after 1975. The reports announced in AMTID after 1978 are more appropriate technology reports, previous issues containing more high technology that could help solve development problems. The order number and price of each title are given but the prices are out of date. Request a new NTIS price list before ordering any reports in this bulletin. Reports are also abstracted in AMTID after issue 1978-5. AMTID's prior to 1978 cite reports on all subjects. Those after 1978 cover a more select set of topics, concentrating on alternative energy, agriculture and aquaculture, small businesses, and management and administration. Almost all the reports cited in AMTID are available from NTIS. All back issues of AMTID are available from NTIS.

PB82-252917 PC **A06**/MF **A01**
National Technical Information Service, Springfield, VA. Office of International Affairs.
Application of Modern Technology to International Development (AMTID),
John Hounsell, Paul Tuebner, and Carlos Izaguiire. 1979, 120p AID-OST-79-1-12

Application of Modern Technology for International Development (AMTID) announces information available from NTIS that has been found to be most useful in developing countries by the end users of the information. From 1972 to 1975 it was published quarterly, and monthly after 1975. The reports announced in AMTID after 1978 are more appropriate technology reports, previous issues containing more high technology that could help solve development problems. The order number and price of each title are given but the prices are out of date. Request a new NTIS price list before ordering any reports in this bulletin. Reports are also abstracted in AMTID after issue 1978-5. AMTID's prior to 1978 cite reports on all subjects. Those after 1978 cover a more select set of topics, concentrating on alternative energy, agriculture and aquaculture, small businesses, and management and administration. Almost all the reports cited in AMTID are available from NTIS. All back issues of AMTID are available from NTIS.

PB82-253196 PC **A05**/MF **A01**
National Technical Information Service, Springfield, VA. Office of International Affairs.
Application of Modern Technology to International Development (AMTID),
Jeanne Bogaert de Perez, Paul Tuebner, B. Gerado Mirabelli, Suthep Vesavakul, and Prithvi Haldea. 1980, 97p AID-OST-80-1-12-E

Application of Modern Technology for International Development (AMTID) announces information available from NTIS that has been found to be most useful in developing countries by the end users of the information. From 1972 to 1975 it was published quarterly, and monthly after 1975. The reports announced in AMTID after 1978 are more appropriate technology reports, previous issues containing more high technology that could help solve development problems. The order number and price of each title are given but the prices are out of date. Request a new NTIS price list before ordering any reports in this bulletin. Reports are also abstracted in AMTID after issue 1978-5. AMTID's prior to 1978 cite reports on all subjects. Those after 1978 cover a more select set of topics, concentrating on alternative energy, agriculture and aquaculture, small businesses, and management and administration. Almost all the reports cited in AMTID are available from NTIS. All back issues of AMTID are available from NTIS.

PB82-253204 PC **A05**/MF **A01**
National Technical Information Service, Springfield, VA. Office of International Affairs.
Aplicacion de Techbologias Modernas al Desarollo Internacional (Application of Modern Technology to International Development) (AMTID),
David B. Shonyo, Richard R. Garcia, and John W. Hounsell. 1978, 100p AID-OST-78-2-9
Text in Spanish.

Application of Modern Technology for International Development (AMTID) announces information available from NTIS that has been found to be most useful in developing countries by the end users of the information. From 1972 to 1975 it was published quarterly, and monthly after 1975. The reports announced in AMTID after 1978 are more appropriate technology reports, previous issues containing more high technology that could help solve development problems. The order number and price of each title are given but the prices are out of date. Request a new NTIS price list before ordering any reports in this bulletin. Reports are also abstracted in AMTID after issue 1978-5. AMTID's prior to 1978 cite reports on all subjects. Those after 1978 cover a more select set of topics, concentrating on alternative energy, agriculture and aquaculture, small businesses, and management and administration. Almost all the reports cited in AMTID are available from NTIS. All back issues of AMTID are available from NTIS.

PB82-253212 PC **A05**/MF **A01**
National Technical Information Service, Springfield, VA. Office of International Affairs.
Application of Modern Technology to International Development (AMTID),
Jesus B. Fragante, Joseph F. Caponio, S. Dickson Tenny, and Utari Bu dihardjo. 1981, 76p AID-OST-81-1-12

Application of Modern Technology for International Development (AMTID) announces information available from NTIS that has been found to be most useful in developing countries by the end users of the information. From 1972 to 1975 it was published quarterly, and monthly after 1975. The reports announced in AMTID after 1978 are more appropriate technology reports, previous issues containing more high technology that could help solve development problems. The order number and price of each title are given but the prices are out of date. Request a new NTIS price list before ordering any reports in this bulletin. Reports are also abstracted in AMTID after issue 1978-5. AMTID's prior to 1978 cite reports on all subjects. Those after 1978 cover a more select set of topics, concentrating on alternative energy, agriculture and aquaculture, small businesses, and management and administration. Almost all the reports cited in AMTID are available from NTIS. All back issues of AMTID are available from NTIS.

PB82-873449 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Document Retrieval Automation. 1975-August, 1982 (Citations from the International Information Service for the Physics and Engineering Communities Data Base).
Rept. for 1975-Aug 82.
Aug 82, 102p
Supersedes PB81-881922.

This bibliography contains citations concerning the methods and systems for computerized retrieval of documents. Emphasis is on models of document retrieval, retrieval effectiveness, and specific retrieval systems. Offline and online systems and applications are included. (This updated bibliography contains 99 citations, 22 of which are new entries to the previous edition.)

PB82-928038 PC **E02**
Central Intelligence Agency, Washington, DC.
Maps: The World; Oceania; Arctic Region; Antarctic Region.
Jul 82, 15p
Color illustrations reproduced in black and white.
Paper copy also available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order, PB82-928000.

The report is maps of the world centered on the Western Hemisphere, showing political entities and selected cities. Includes 5 degree grid interval with 145 degree overlap in the Eastern Hemisphere. Also included are maps of Oceania, and the Arctic and Antarctic regions. Scales vary.

5C. Economics

AD-A117 573/6 PC **A10**/MF **A01**
SRI International, Arlington, VA.
SEMREC3A, Volume I - User's Guide.
Final rept. 18 Dec 78-1 Jan 81,
J. Cole, and C. Movit. 1 Jan 81, 210p SRI-CEPR-TN-8156-1, DNA-5619F-1, SBI-AD-E301 014
Contract DNA001-79-C-0102
See also Volume 2, AD-C028 765.

This document is intended to provide users of the SEMREC3A version of the Soviet postattack economic recovery model with the information required to design, run and to some extent interpret model simulations.

AD-A117 661/9 PC **A02**/MF **A01**
Construction Engineering Research Lab. (Army), Champaign, IL.
Economic Impact Forecast System (EIFS). Version 2.0. Users Manual. Supplement II. European Economic Impact Forecast System (EEIFS), Phase 1, (FRG/EIFS Pilot Model).
Technical rept.,
Ronald Dwight Webster, Susan Odom, and Joseph Wayne Hamilton. May 82, 15p Rept no. CERL-TR-N-69-SUPPL-2
Supplement 2 to report dated Jul 79, AD-A073 667.
See also Supplement 1, AD-A116 953.

This supplement describes Phase 1 of the development of a European Economic Impact Forecast System (EEIFS) by the U.S. Army Construction Engineering Research Laboratory (CERL). EEIFS is designed to interface with the EIFS component of CERL's Environmental Technical Information System (ETIS). This supplement describes the data acquisition and pilot model development of an EIFS model which includes statistics to predict the regional economic benefits and impacts of defense-related activities in the Federal Republic of Germany (FRG). User instructions and employment data for the FRG/EIFS data base are given. (Author)

AD-A117 753/4 PC **A07**/MF **A01**
Department of State, Washington, DC. Office of External Research.
The Planetary Product in 1980: A Creative Pause,
Herbert Block. Aug 81, 132p FAR-299-GP, SBI-AD-E750 259

This latest edition of a one-man effort to assess the world's total output over three decades encounters numerous factual, conceptual, and methodological hurdles. Part I describes these difficulties, explains the meaning and reliability of the detailed statistical tables, and examines the relationships between a hard-to-grasp reality and its representation in figures. Part II considers the political and economic influences that have led to wide regional differences in growth.

DE82009611 PC **A07**/MF **A01**
Westinghouse Research and Development Center, Pittsburgh, PA.
Advanced Electric-Heat-Pump Market and Business Analysis. Final Report.
J. C. Kastovich, R. R. Lawrence, R. R. Hoffman, and C. Pavlak. Apr 82, 141p ORNL/Sub-79-24712/1
Contract W-7405-ENG-26
Portions of document are illegible.
Microfiche only after original copies are exhausted.

The primary focus of the study was a comparison of the electric heat pump with six central forced air systems. Key domestic market segments analyzed were new residential construction, replacement of existing systems with similar systems, replacement of existing systems with different systems, and addition to existing systems. The major study objective was to determine the sales potential for an advanced electric heat pump, i.e., a heat pump with an annual energy efficiency at least 20% better than the most efficient unit available in 1979. This includes identifying the climatic region to which the advanced electric heat pump is most applicable and whether it is commercially viable product, i.e., whether the unit can be produced and sold in sufficient volume to generate an acceptable return to the manufacturer. The market position of currently available heat pumps was established. Historical and forecasted heat pump shipments were examined by volume, system type, unit capacity, energy efficiency, region, application (new construction, add-on, replacement, retrofit), and customer (residential, commercial). An analysis of personal interviews, mail, and telephone surveys to assess the market potential of the advance electric heat pump was used to determine the purchase criteria, including payback period, desired product features, barriers to commercialization, and applicability to market segments. A model was devised to project the unit sales volume under varying economic assumptions. (ERA citation 07:043998)

DE82012052 PC **A05**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Natural Gas Annual 1980.
D. Hinton, G. Koelling, J. McCarrick, M. McDonald, and C. Reading. Feb 82, 86p DOE/EIA-0131-80
Portions of this report are illegible.

This publication provides information on the production, imports, exports, interstate movements, storage, and consumption of natural and supplemental gas to a wide audience, including industry, consumers, Government Agencies, and educational institutions. The data are presented in a sequence that follows natural and supplemental gas from production to end-use. Annual summary data on the quantity and value of natural gas production at the State and National levels are presented, as well as total gas supply/disposition balances. Quantities and values of consumption are shown for major end-use categories by State.

DE82012363 PC **A03**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Technology Assessment of Solar Energy Systems: A Comparison of Capital and Labor Requirements for High and Low Solar-Development Scenarios.
J. Sathaye, H. Ruderman, and P. Chan. Sep 81, 39p
LBL-12845
Contract AC03-76SF00098

The capital and labor requirements for a high solar scenario are compared with those for a low solar scenario. These requirements are estimated for the conventional and solar components of the energy scenario. Indirect labor requirements are also estimated.

DE82012599 PC **A14**/MF **A01**
Little (Arthur D.), Inc., Cambridge, MA.
Consumer Products Efficiency Standards Engineering Analysis Document.
Mar 82, 320p DOE/CE-0030
Contract AC03-78CS20420

A technical and economic analysis was completed for refrigerators and refrigerator-freezers, freezers, water heaters, furnaces and boilers, clothes dryers, kitchen ranges and ovens, central and room air conditioners. The relationship between the cost of a consumer product and its efficiency was estimated for each product class based on engineering analyses. The engineering basis for these relationships is reported. The general methodology used in making these estimates is described and details of the analysis by product type are given. (ERA citation 07:043957)

DE82012785 MF **A01**
Urban Systems Research and Engineering, Inc., Cambridge, MA.
Analysis of the Impact of Federal Tax Incentives on Market Diffusion for Solar Thermal/WECS Technologies 1980-1990. Final Report.
15 Oct 81, 133p UCRL-15445-V.2
Contract W-7405-ENG-48
Portions of document are illegible.
Available in microfiche only.

The technical appendices include: an estimate of the additional industrial energy services market from 1980-1990; data and assumptions used to develop the technology cost information, which is in turn used to devlop market penetration model and forecasts, market penetration models for space and direct heat and process heat; financial, equipment cost, and performance parameters for performing market penetration study; capital and operating and maintenance costs for conventional industrial energy systems and for solar energy systems with conventional backup; a review of market diffusion models for new industrial energy supply technologies; and financial formulae. (ERA citation 07:042742)

DE82902360 MF **A01**
Long-Term Developments on the World Market for Bituminous Coal with Special Regard to the Supply of the Federal Republic of Germany.
W. Lange. 1980, 252p NP-2902360
In German.Thesis.
U.S. Sales Only. Available in microfiche only.

The present study on the developments of supply and demand of the energy carrier bituminous coal at home and abroad - within an analytical period reaching from now until the year 2000 - is mainly based on prognoses of notable institutions. Significant characteristics which seem to indicate different developments are also considered. It has to be taken into consideration that the future development of the primary energy demand and its coverage by the various energy carrier are uncertain in a high degree after the fundamental events since 1973 and the problems caused by nuclear energy. The effects of all the processes in the worldwide mineral oil market on the whole field of power economy cannot yet be finally estimated. His especially difficult, to make forecasts on the user's reactions on the increasing price level. In general forecasts made on the economic growth which will be the most important determinant for energy demand also in the future are based on lower increase rates compared to previous estimations. It is also presupposed that, because of energy being saved, tendencies indicating saturation in developed economic systems, and the change towards a rather more qualitative growth, the increase rates show a downward trend in the long term. (ERA citation 07:043867)

PB82-227844 PC **A03**/MF **A01**
Witherspoon Development Corp., New York.
Witherspoon Development Corporation: Final Report.
Apr 82, 44p
Grant EDA-99-06-16018

Witherspoon Development Corporation reviewed and assessed business proposals generated by minority businesses, community development organizations and local development organizations. The results of this review and assessment are recorded in this report.

PB82-228685 PC **A04**/MF **A01**
Interagency Task Force on Small Business Finance, Washington, DC.
Studies of Small Business Finance: A Report to Congress.
Feb 82, 67p ITFOSBF-82/01
See also PB82-228693.
Also available in set of 23 reports PC E99, PB82-228677.

The report consists of three chapters summarizing studies on small business finance, and a fourth chapter of views and recommendations of collecting data on commerical bank small-business loan activity. The first chapter summarizes 20 studies prepared by academicians and Federal Reserve staff. In the second chapter the results of a survey of commerical bank lending officers are summarized. The third chapter presents a summary of written comments submitted by small businesses on the flow of bank credit to them.

PB82-228693 PC **A05**/MF **A01**
Interagency Task Force on Small Business Finance, Washington, DC.
Studies of Small Busines Finance: Small Firms' Access to Public Equity Financing.
Hans R. Stoll. Feb 82, 82p ITFOSBF-82/02
See also PB82-228685, and PB82-228701.
Also available in set of 23 reports PC E99, PB82-228677.

The study discusses the factors that affect small business' use of public financing, in terms of the costs to the small business and to investors. It suggests that in both the primary and secondary equity markets the costs of financing are more than most small firms can manage. The principal costs include: underwriting fees for new equity issues as well as spreads and commissions on traded securities. These changes are typically higher for small business because of the small financing amount, infrequently traded securities, and lack of investor information about the firm.

PB82-228701 PC **A08**/MF **A01**
Interagency Task Force on Small Business Finance, Washington, DC.
Studies of Small Business Finance: Survey of Commercial Bank Lending to Small Business.
Cynthia A. Glassman, and Peter L. Struck. Feb 82, 159p ITFOSBR-82/03
See also PB82-228693, and PB82-228719.
Also available in set of 23 reports PC E99, PB82-228677.

The study reports on an extensive survey of commercial banks to obtain information on the banks' lending practices to small businesses. Information was gathered through the use of personal interviews. General topics covered in the survey were: bank organization with respect to small business, credit availability, loan characteristics, pricing and profitability, government programs, and availability of loan information items. The following characteristics of banks were used to categorize responses: bank size, state banking law, bank branch and holding company structure, census region, primary bank market location, and primary federal bank regulator.

PB82-228719 PC **A04**/MF **A01**
Interagency Task Force on Small Business Finance, Washington, DC.
Studies of Small Business Finance: Application of the Modern Theory of Finance to Small Business Firms.
John J. McConnell, and R. Richardson Pettit. Feb 82, 52p ITFOSBF-82/04
/see also PB82-228701, and Pb82-228727.
Also available in set of 23 reports PC E99, Pb82-228677.

In this study the authors investigate whether small business would benefit from the use of modern finance theory. The modern theory of finance integrates the previously somewhat separate fields of business finance, investments, and financial markets using models of financial behavior. The authors point out that the models were developed using, and tested on, relatively large corporations. In applying these models to the case of a small business, several problems are encountered. Among these are identifying the value of the firm and the need to have available large amounts of computer capacity to run the models. Notwithstanding these problems, the authors conclude by offering three suggestions to the small business owner-manager: (1) Use the Miller-Orr control limit model for their cash balance control. This model offers simplicity and a fairly high degree of accuracy. (2) The safest level of debt for a small firm would be the particular industry average. This is suggested because the appropriate models have questionable accuracy. (3) The dividend policy of a small firm should be to minimize the owner's (stockholder's) personal taxes.

PB82-228727 PC **A02**/MF **A01**
Interagency Task Force on Small Business Finance, Washington, DC.
Studies of Small Business Finance: Responses to the Small Business Administration 'Federal Register' Notice Requesting Small Business Comments on Credit Needs.
Feb 82, 17p ITFOSBF-82/05
See also PB82-228719, and PB82-228735.
Also available in set of 23 reports PC E99, Pb82-228677.

To complement the survey of commercial banks, the Small Business Administration invited small businesses to comment on their experiences in obtaining bank credit by answering several questions set forth in a notice published in the Federal Register on October 13, 1981. These questions covered how well commercial banks were meeting small business credit needs, any difficulties small businesses had in obtaining bank credit, and how bank characteristics or specific bank policies appear to affect a bank's willingness or ability

to meet small business credit needs. The notice asked also for comments on small business experience with government loan programs and for certain information about the respondents. The report consists of the Federal Register notice, a respondent profile section, and a summary of the responses. Following the summary the responses are presented in tabular form.

PB82-228735 PC **A04**/MF **A01**
Interagency Task Force on Small Business Finance, Washington, DC.
Studies of Small Business Finance: Tax Policy and Small Business Financing,
Thomas S. McCaleb. Feb 82, 62p ITFOSBF-82/06
See also PB82-228727, and PB82-228743.
Also available in set of 23 reports PC E99, PB82-228677.

The report discusses the effects of taxation on investment risk-taking and on sources of small business financing. For providing risk-taking incentives, the author states that a progressive tax is less favorable to risk-taking than a proportional tax. Also, the inclusion of some form of loss offset is favorable to risk-taking. Small businesses, however, may not be able to take advantage of an offset provision because they may not have the current, past, or future income to fully utilize the offset. Therefore, a loss is relatively more significant to a small business, raising the risk of investing in it. Taxation also affects sources of financing. Because interest on debt is tax deductible and dividends are not, firms are encouraged to finance with debt.

PB82-228743 PC **A04**/MF **A01**
Interagency Task Force on Small Business Finance, Washington, DC.
Studies of Small Business Finance: The Impact of Usury Laws on the Effectiveness and Efficiency of the Operation of Small Business,
R. Richardson Pettit, and John J. McConnell. Feb 82, 75p ITFOSBF-82/07
See also PB82-228735, and PB82-228750.
Also available in set of 23 reports PC E99, PB82-228677.

The study takes an extensive look at the effect of interest rate ceilings on the behavior of lenders and thus the effect on small business borrowers. The study gives both empirical and theoretical arguments for the actual effects of rate ceilings on lenders and borrowers. It is shown that as rate ceilings become more restrictive high risk borrowers, both consumers and business, are eliminated from the market. Also as the restrictions become more severe, lenders shift capital to less restrictive markets, and the structure of loans change to shorter maturities and smaller loan sizes.

PB82-228750 PC **A04**/MF **A01**
Interagency Task Force on Small Business Finance, Washington, DC.
Studies of Small Business Finance: A Review of the Small Business Administration's Major Loan Programs,
Timothy Bates. Feb 82, 55p ITFOSBF-82/08
See also PB82-228743, and PB82-228768.
Also available in set of 23 reports PC E99, PB82-228677.

The study measures the effectiveness of two loan programs of the Small Business Administration. The two programs are: the Regular Business Loan Program (7(a)), and the Economic Opportunity Loan (EOL) Program. The evaluation measurement is the number of successful businesses assisted by the SBA's programs. A critical variable in the measurement process is the definition of a successful business in the context of SBA loans.

PB82-228768 PC **A02**/MF **A01**
Interagency Task Force on Small Business Finance, Washington, DC.
Studies of Small Business Finance: Business Development Credit Corporations,
Paul S. Anderson. Feb 82, 22p ITFOSBF-82/09
See also PB82-228750, and PB82-228776.
Also available in set of 23 reports PC E99, PB82-228677.

Business Development Credit Corporations (BDCC) are state-chartered, private corporations. Their purpose is to encourage small business, in high unemployment areas, through an increase in credit availability. BDCCs obtain funds by selling stock or accepting loans from contributing sources, which include banks, investing institutions, and private investors. The largest source of funds, however, is the Small Business Administration. The study investigates why BDCCs have declined since their peak in 1968.

PB82-228776 PC **A04**/MF **A01**
Oregon State Personnel Div., Salem.
Studies of Small Business Finance: Role of Small Business in the American Economy,
Lawrence J. White. Feb 82, 73p ITFOSBF-82/10
See also PB82-228768, and PB82-228784.
Also available in set of 23 reports PC E99, PB82-228677.

The study provides a two-part explanation of small business's role in the economy. The first part takes a current and historical look at the relative importance of small business in various sectors of the economy. In the second part, a quantitative approach is used to explain why small businesses fare better in some sectors of the economy and not in other sectors. The study uses extensive sales and employment data as well as regresssion analysis to support the findings.

PB82-228784 PC **A03**/MF **A01**
Oregon State Personnel Div., Salem.
Studies of Small Business Finance: Who Finances Small Business Circa 1980,
Victor L. Andrews, and Peter C. Eisemann. Feb 82, 35p ITFOSBF-82-11
See also PB82-228776, and PB82-228792.
Also available in set of 23 reports PC E99, PB82-228677.

The study explains the different sources of financing available to a small business and how each source affects the small business community. The sources covered include: Trade Debt, Commercial Banks, Insurance Companies, Finance Companies, and Government.

PB82-228792 PC **A03**/MF **A01**
Interagency Task Force on Small Business Finance, Washington, DC.
Studies of Small Business Finance: Commercial Bank Business Lending by Size of Loan,
Thomas F. Brady. Feb 82, 26p ITFOSBF-82/12
See also PB82-228784, and PB82-228800.
Also available in set of 23 reports PC E99, PB82-228677.

The paper attempts to draw inferences regarding differences in commercial bank credit practices with respect to large and small business borrowers from the Federal Reserve Survey of Terms of Bank Lending (STBL). The STBL provides, for all insured commercial banks, estimates of gross business loans extended, loan rates charged, whether loan rates are fixed or floating, whether loans are secured, and their maturity and commitment status.

PB82-228800 PC **A03**/MF **A01**
Interagency Task Force on Small Business Finance, Washington, DC.
Studies of Small Business Finance: Relationship between Commercial Bank Loan Size and Size of Borrower,
Martha S. Scanlon. Feb 82, 32p ITFOSBF-82/13
See also PB82-228792, and PB82-228818.
Also available in set of 23 reports PC E99, PB82-228677.

Due to the overall lack of information on the size of commercial borrowers, much of the research in the area of small business financing is done under the assumption that loan size has a close correlation to the size of the borrower. The study uses the data from two surveys, the 1972 Business Loan Survey and the 1968 St. Louis Survey, to discuss the assumption that loan size is a valid indicator of the size of the borrower. The author considers factors that would affect the size relationships such as: any prior commitment for the loan, the lender's participation in a group financing arrangement, and/or the size of the lending bank.

PB82-228818 PC **A02**/MF **A01**
Interagency Task Force on Small Business Finance, Washington, DC.
Studies of Small Business Finance: Loan Rates, Operating Costs and Size of Loan: The Evidence from Cross-Section Data,
Neil B. Murphy. Feb 82, 25p ITFOSBF-82/14
See also PB82-228800, and PB82-228826.
Also available in set of 23 reports PC E99, PB82-228677.

In this study, the author uses mathematical models to establish the relationship between (1) loan interest rates and loan size and (2) operating costs and loan size. In the discussion of loan rate and loan size, the model is explained in terms of factors that would affect the interest rate charged. These factors include: use of collateral, fixed or floating interest rate, the demand status of the loan, and whether the lender had a prior commitment to make the loan as well as the size of the loan. In the discussion of operating cost and loan size, five influencing factors besides loan size were cited: Number of loans in the portfolio, the lender's mix of loan types, average loan size, lender's wage rate, and lender's numbr of full service loan size constant, the study found a substantial inverse relationship between operating costs and loan size. A bibliography is provided.

PB82-228826 PC **A03**/MF **A01**
Interagency Task Force on Small Business Finance, Washington, DC.
Studies of Small Business Finance: Small Business Access to Capitol Markets through Pension Funds,
Richard Zock. Feb 82, 39p ITFOSBF-82/15
See also PB82-228818, and PB82-228835.
Also available in set of 23 reports PC E99, PB82-228677.

The author studies the effects of the Employee Retirement Income Security Act (ERISA) on small business access to pension fund supplied capital. The study gives a brief history of the Department of Labor's restrictions on the types of investments pension funds can hold since the passage of ERISA. The initial restrictions severely cut pension fund participation in the venture capital market (which is an important source of financing for small business).

PB82-228834 PC **A03**/MF **A01**
Interagency Task Force on Small Business Finance, Washington, DC.
Studies of Small Business Finance: Credit Rationing and Small Business Finance,
Stuart I. Greenbaum, George Kanatas, and Sudhakar D. Deshmukh. Feb 82, 49p ITFOSBF-82/16
See also PB82-228826, and PB82-228842.
Also available in set of 23 reports PC E99, PB82-228677.

In their study, the authors explain credit rationing and how it affects small businesses' chances of financing through loans. With the help of a mathematical model the decision processes of two lender types are discussed. The first type of lender, an asset-transformer, acquires funds in anticipation of loan demand, at a fixed-rate and is relatively less sensitive to an applicant's qualifications. The second lender type is a broker, who acquires lendable funds as needed and, assuming constantly increasing interest rates, has relatively greater costs. A broker will also be more critical of applicant risk than the asset-transformer.

PB82-228842 PC **A03**/MF **A01**
Interagency Task Force on Small Business Finance, Washington, DC.
Studies of Small Business Finance: Credit Cards and the Financing of Small Businesses,
Lewis Mandell. Feb 82, 29p ITFOSBF-82/17
See also PB82-228834, and PB82-228859.
Also available in set of 23 reports PC E99, PB82-228677.

The author in this study discusses the effects of credit cards on credit in general, as well as the advantages and disadvantages of credit card acceptance by small businesses. To illustrate the cards' effect on credit the author points out that the ratio of consumer credit to retail sales has remained about constant for the period of 1969 through 1979. However, the amount of credit retailers carry, as accounts receivables, has declined in relative terms over the same period. This may be attributed to the rapid growth of bank card credit. As far as small businesses are concerned, the benefits of accepting bank cards include: reduced cost of credit operations, fewer losses, and a wider customer base.

PB82-228859 PC **A05**/MF **A01**
Interagency Task Force on Small Business Finance, Washington, DC.
Studies of Small Business Finance: The Impact of Bank Regulation on Small Business Financing,
Harry P. Guenther. Feb 82, 81p ITFOSBF-82/18
See also PB82-228842, and PB82-228867.

Also available in set of 23 reports PC E99, PB82-228677.

The study is a detailed investigation of how government regulations restrict banks' abilities to finance small businesses. At the heart of the problem is the perception of some bankers and especially regulators that small businesses pose a greater risk than large businesses. The author states that this is not necessarily true but that there is no hard evidence that reflects the rate of failure between small and large businesses. Most regulations are designed to avert risk. Some, in their attempt to avert risk, actually prevent a bank from reducing the risk of a given loan.

PB82-228867 PC **A02**/MF **A01**
Interagency Task Force on Small Business Finance, Washington, DC.
Studies of Small Business Finance: Lease Financing: An Attractive Method of Financing for Small Firms,
Oswald D. Bowlin. Feb 82, 17p ITFOSBF-82/19
See also PB82-228859, and PB82-228875.
Also available in set of 23 reports PC E99, PB82-228677.

A large increase in the use of leasing has occurred in the last fifteen years. This is primarily due, according to the author, to high interest rates keeping firms out of the long-term capital markets. The study states that leasing can produce many benefits over the purchase of the same asset. The cost of leasing can be lower than the cost of purchasing due to a wide variety of tax and purchasing advantages on the part of the lessor. Additional advantages to both parties include: reduced default risk, avoidance of technological obsolesence, and built-in financing. The study concludes that a lease offers significant advantages, especially to a small firm that has difficulty obtaining financing.

PB82-228875 PC **A05**/MF **A01**
Interagency Task Force on Small Business Finance, Washington, DC.
Studies of Small Business Finance: Equity Participation Agreements and Commercial Bank Loans to Small Business Firms,
David J. Brophy. Feb 82, 83p ITFOSBF-82/20
See also PB82-228867, and PB82-228883.
Also available in set of 23 reports PC E99, PB82-228677.

The author shows that use of Equity Participation Agreements (EPAs) account for less than one half of one percent of total bank commercial loans surveyed. This amount is far lower than expected because EPA use has benefits for both lender and borrower. The lender benefits by receiving more protection if the borrower increases the riskiness of his business or if the borrower defaults. The borrower benefits because EPAs can reduce constrictive loan terms and can be a relatively painless method for paying a lender for extra services.

PB82-228883 PC **A03**/MF **A01**
Interagency Task Force on Small Business Finance, Washington, DC.
Studies of Small Business Finance: Franchising and the Financing of Small Business,
Robert Mittelsteadt, and Manferd O. Peterson. Feb 82, 41p ITFOSBF-82/21
See also PB82-228875, and PB82-228891.
Also available in set of 23 reports PC E99, PB82-228677.

The study addresses the effect of franchising on the financing of small businesses. The relationship of the franchisee and franchisor and how the Small Business Administration (SBA) handles franchises are discussed.

PB82-228891 PC **A03**/MF **A01**
Interagency Task Force on Small Business Finance, Washington, DC.
Studies of Small Business Finance: Changes in Commercial Banking Structure and Small Business Lending,
Bernard Shull. Feb 82, 43p ITFOSBF-82/22
See also PB82-228883, and PB82-228909.
Also available in set of 23 reports PC E99, PB82-228677.

The structure of commercial banking has changed dramatically in the past twenty years. These changes include: the growth of branch banking and bank holding companies, an increase in number and decrease in concentration of local banking markets, and the growth of foreign banks operating in the domestic market. In the study, the author investigates the effect of these changes on lending to small businesses.

PB82-228909 PC **A03**/MF **A01**
Tactical Air Control Center Squadron (603rd), APO San Francisco 96570.
Studies of Small Business Finance: American Commercial Banking Structure and Small Business Lending,
Donald T. Savage. Feb 82, 47p ITFOSBF-82/23
See also PB82-228891.
Also available in set of 23 reports PC E99, PB82-228677.

The study examines the effect of the growth of branch banking and bank holding companies on the availability of bank credit to small businesses. The growth of branch banking and the expansion of bank holding companies have had both a positive and a negative influence on small business credit. As a negative influence, if the branching or growth of a holding company was accomplished through the acquisition of another bank, then the bank concentration ratio in that market would have risen. This occurrence has been associated with higher interest rates, within that market, to the detriment of small business. As a positive influence, larger banking organizations may be willing to take more risk and offer more services than a small bank, benefiting small business.

PB82-251539 PC **A05**/MF **A01**
Bureau of Industrial Economics, Washington, DC.
Franchising in the Economy, 1980-1982.
Jan 82, 95p

Franchising, as a method of distribution, has become a significant part of the U.S. economy, comprising numerous categories of commercial enterprise and including all of the ingredients of the marketing system--planning, production, packaging, pricing, promotion, advertising, selling, buying, and competing. It is perhaps the only form of business organization that, by its very nature, tends to create new business units. When the franchisee joins the franchise system, the new tradename, the acquisition of a distinctive business appearance, and the standardization of products, services, and operations procedures lead to the birth of a new enterprise for the express purpose of marketing the franchisor's products or services. The report contains the results of the 11th annual survey of franchisors.

PB82-251547 PC **A03**/MF **A01**
Bureau of Industrial Economics, Washington, DC.
Confectionery Manufacturers Sales and Distribution 1979,
Renee L. Gallop, Diane Wilson, and Jean A. Carter. Dec 80, 33p
Errata sheet inserted.

This 53rd annual report on Confectionery Manufacturers' Sales and Distribution presents detailed data on the volume and value of sales, ingredient use, and foreign trade as well as analysis of significant industry developments.

PB82-252784 PC **E02**/MF **E02**
London Business School (England). Econometric Forecasting Unit.
Rational Expectations and the Term Structure of Interest Rates: Why Bond Prices do not Follow a Random Walk,
David K. H. Begg. Jul 82, 22p DISCUSSION PAPER-96

Mishkin has argued that the Fundamental Theorem has a striking implication: when bond market participants display risk-neutrality, the N-period redemption yield should follow a random walk. The purpose of this note is to argue that Mishkin's result is misleading. More generally, the N-period decision horizon may not be the relevant characterization of asset market equilibrium. Section 2 restates Mishkin's result in the context of a simple model in which foresight is perfect. Section 3 argues that the N-period decision horizon leads to inconsistent results and reformulates the problem when decisions may be recomputed every period. It is simplest to analyze the case in which bonds are perpetuities and it is shown that market efficiency typically requires foreseen capital gains. A simple formula for expected capital gains is derived. Section 4 extends the analysis to bonds with a finite term to maturity. Tax rates and differences in coupon interest payments then play a more interesting role and the dependence of prices and yields on these is analyzed. Having developed models of price and yield determination, the time series behavior of N-period prices and yields is then examined.

PB82-252990 PC **A10**/MF **A01**
Federal Railroad Administration, Washington, DC.
Carload Waybill Statistics Based on Sample of Waybills for Terminations in the Year 1980. Territorial Distribution Traffic and Revenue by Commodity Classes.
Jun 82, 214p
See also PB82-126574.

The statistics documenting rail movements for 1980 were derived from a total of 179,828 Bills of Lading--resulting in 205,934 Carloads. Section II provides a complete description of the sample including a list of the railroads which submitted data. An integral part of the waybill data shows such statistics as car-miles and ton-miles on a commodity basis between major geographical areas. Section III describes the mileage calculation procedure which is part of the waybill processing system. The commodity code structure is detailed in section IV and the geographical territories are defined in section V.

PB82-873506 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Electronic Funds Transfer (EFT). 1975-August, 1982 (Citations from the International Information Service for the Physics and Engineering Communities Data Base).
Rept. for 1975-Aug 82.
Aug 82, 89p
Supersedes PB82-855628.

This bibliography contains citations concerning techniques, equipment, and systems for electronic funds transfer (EFT). Topics include security and/or privacy, artificial intelligence in EFT, and recent developments and trends. Some attention is given to legislative and legal aspects of EFT. (This updated bibliography contains 103 citations, 14 of which are new entries to the previous edition.)

5D. History, Law, and Political Science

AD-A117 605/6 PC **A04**/MF **A01**
Joint Chiefs of Staff, Washington, DC. Special Operations Div.
Soviet News and Propaganda Analysis Based on RED STAR (The Official Newspaper of the Soviet Defense Establishment) for the Period 1-31 May 1982. Volume 2, Number 5.
1982, 52p
See also Volume 2, Number 4, AD-A116 289.

In May 1982, the Soviet Union reacted sharply to President Reagan's foreign policy speech of May 9th. Moscow's rhetoric and propaganda was bitter and sarcastic in regard to all aspects of the President's foreign policy statements. The official news media headlined that: Reagan's suggestions are unreasonably favorable for Washington and its policy of nuclear supremacy; Reagan did not even mention Pershing II missiles, the neutron bomb or the Trident program; Reagan attempts to appease the European peace movement, but insists on U.S. military supremacy. The Kremlin heightened the tone and scope of its propaganda campaign to support the theme that 'the United States is scuttling detente while the Soviet Union favors immediate disarmament, an end to the arms race, and the prevention of nuclear war.' The official Soviet print media strongly underscored that Washington is not at all serious about disarmament and arms reduction.

AD-A117 652/8 PC **A02**/MF **A01**
Army War Coll. Strategic Studies Inst., Carlisle Barracks, PA.
MX or Butter.
Strategic issues research memo.,
Edward A. Corcoran. 15 Jun 82, 18p

Facing the enormous projected costs of strategic systems such as MX, this memorandum addresses the need for a basic assessment of US strategic objectives, particularly long-term US goals in regard to the Soviet Union. While military expenditures can provide the United States short term security, long-term security is grounded on social development. Policies seeking such an evolution must integrate political, military, economic, social, and psychological instruments into a comprehensive and internally consistent strategy. Only against the background of such a strategy can the utility of major programs such as MX be assessed. (Author)

AD-A117 703/9 PC **A03**/MF **A01**
Army War Coll. Strategic Studies Inst., Carlisle Barracks, PA.
Soviet Challenges for the 1980's: Implications for the United States.
Strategic issues research memo.,
Keith A. Dunn. 20 May 82, 33p

This memorandum develops a US political-military strategy for dealing with the USSR in the coming decade. To do this, the author examines US interests and objectives. He analyzes the most significant economic, political, and military trends confronting Soviet decisionmakers and suggests possible Soviet solutions for those trends. Finally, the author concludes with a section on US strategic issues and the most appropriate options for the United States to pursue to achieve its interests and objectives vis-a-vis the USSR in the coming decade.

AD-A117 811/0 MF **A01**
American Univ., Washington, DC. Foreign Area Studies.
Czechoslovakia: A Country Study. Revised.
Area handbook series,
Richard F. Nyrop. Apr 81, 378p
Replaces the 'Area Handbook for Czechoslovakia' dated 1972.
Availability: Superintendent of Documents, GPO, Washington, DC 20402 HC $12.00 Microfiche furnished to DTIC (and NTIS) users.

This volume is one of a continuing series of books prepared by Foreign Area Studies, The American University, under the Country Studies/Area Handbook Program. The last page of this book provides a listing of other published studies. Each book in the series deals with a particular foreign country, describing and analyzing its economic, national security, political, and social systems and institutions and examining the interrelationships of those systems and institutions and the ways that are shaped by cultural factors. Each study is written by a multidisciplinary team of social scientists. The authors seek to provide a basic insight and understanding of the society under observation, striving for a dynamic rather than a static portrayal of it. The study focuses on historical antecedents and on the cultural, political, and socioeconomic characteristics that contribute to cohesion and cleavage within the society. Particular attention is given to the origins and traditions of the people who make up the society, their dominant beliefs and values, their community of interests and the issues on which they are divided, the nature and extent of their involvement with the national institutions, and their attitudes toward each other and toward the social system and political order within which they live.

PB82-250655 PC **A05**/MF **A01**
Northwestern Univ., Evanston, IL.
Analytical Study of the Legal and Operational Aspects of the Minnesota Law Entitled 'Chemical Test for Intoxication' M.S.A. Sec. 169, 123.
Final rept. Jul-Dec 81,
Robert H. Reeder. Dec 81, 86p LEGAL-1, DOT-HS-806 170
Contract DTNH22-81-P-05176

This report provides information for use by state legislatures, state governmental agencies, traffic safety organizations and other persons in enacting laws to control driving and drinking on the highways and specifically the type of administrative per se law in the State of Minnesota. The report outlines the legal framework of the administrative per se law in the State of Minnesota. It explores the possible legal challenges which defendants might raise against the law. It studies the operational impact the administrative per se law has had in Minnesota on other alcohol countermeasures to control the drinking driver. The report concludes the Minnesota administrative per se law would withstand the possible legal challenges. It concludes that the enactment of this law has had a positive effect on the attitudes of law enforcement officers and has increased the effort of controlling DWI offenses. The report recommends that other states enact such a law.

PB82-254251 PC **A03**/MF **A01**
Alaska Univ., Fairbanks. Marine Advisory Program.
Marine Partnerships - Their Various Forms and Legal Ramifications.
Marine advisory bulletin,
L. B. Jake Jacobson. May 82, 26p ASG-MAB-13, NOAA-82072102

Information dealing specifically with fisheries partnerships is given. Basically, a partnership is a venture including two or more persons in the operation of a business for profit. In the Alaska Partnership Act, the Legislature has adopted the provisions of the Uniform Partnership Act. The terms of the Uniform Partnership Act in Alaska are basically the same as those found in Washington, California, and elsewhere. This bulletin gives specific information on: Who's responsible; What does a partner own; A written agreement; Buying out; Dealing with your partners; Management clause; Authority clause; Who's liable; Dividing the spoils; Getting out; Why have partners; and disadvantages of partnerships.

PB82-254343 PC **E04**/MF **E04**
Commission of the European Communities, Luxembourg.
Actions against Smoking in the Member States of the European Communities: Situation on 30 June 1981.
c1982, 71p EUR-7531-EN, ISBN-92-825-2715-8
Customers in the European Community countries should apply to the Office for Official Publications of the European Communities, B.P. 1003, Luxembourg.

With respect to the anti-smoking campaign within the European Communities, information, updated to June 30, 1981, was requested from each Member State by questionnaire. An assessment is made of measures prohibiting smoking in public places, in educational establishments, places of work and elsewhere, of informative measures including statutory warning on packaging and prohibition of advertising, of educational measures directed at young persons as part of general health education, and at the public as a whole through the mass media, and at the medical profession. The effects of policies on tobacco consumption and on public health are investigated and current research is outlined. Penalties for infringement of any laws and regulations are compared.

5E. Human Factors Engineering

AD-A117 917/5 PC **A04**/MF **A01**
Coast Guard Research and Development Center, Groton, CT.
A Pilot Study of Human Factors in SAR.
Interim rept. Apr 80-May 82,
D. I. Remondini, M. Light, M. L. Everson, L. Nash, and D. L. Good. May 82, 70p CGR/DC-5/82, USCG-D-19-82

During three visual detection experiments, the USCG R&D Center collected human factors information. Various human factor parameters thought intuitively to affect the performance of a lookout were measured and analyzed. These included experience level, time on watch, amount of sleep, and lookout position. In addition, Hidden Pattern and Figure Tests were administered to the lookout subjects in these studies. This report presents the results of this pilot study. Lookout subjects from HH-3F and HH-52A helicopters, 82-ft patrol boats (WPBs), 210-ft medium endurance cutters (WMECs), and 41-ft small utility boats (UTBs) were included. Time on watch was found to have a marked influence on performance of lookouts on surface units. A marginal relationship was found between test scores and performance. Data from an experiment dedicated to human factors parameters is necessary for a proper investigation. (Author)

5F. Humanities

PB82-249665 PC **A13**/MF **A01**
National Park Service, Denver, CO. Denver Service Center.
Historic Structure Report: Historical Data Section, Old City Hall, Lowell National Historical Park, Lowell, Massachusetts. Package No. 105 (Project Type 35), 1826-1890,
Harlan D. Unrau. Jan 82, 298p FNP-400-82-30
Portions of this document are not fully legible.

Old City Hall is significant as the seat of the municipal government of Lowell, the first planned industrial and manufacturing city in the United States, from 1830 to 1893. After Lowell was established as a town in 1826, the structure was built in 1829-30 to serve as the Town House. When Lowell was incorporated as a city in 1836, the building became known as the City Hall. This Historic Structure Report contains the historical data section which provides basic data for the stabilization, preservation, and restoration of the structure to its 1896 appearance. This section will constitute the primary data base for the future interpretation of the site. Although the structural evolution and use of the structure from 1829 to the present has been included in the report, special attention to the post 1895-96 alterations has been emphasized to assist in the restoration.

5G. Linguistics

AD-A117 440/8 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
Parsing and Generating English Using Commutative Transformations.
Memorandum rept.,
Boris Katz, and Patrick H. Winston. May 82, 20p
Rept no. AI-M-677
Contract N00014-80-C-0505

This paper is about an implemented natural language interface that translates from English into semantic net relations and from semantic net relations back into English. The parser and Companion generator were implemented for two reasons: (a) to enable experimental work in support of a theory of learning by analogy; and (b) to demonstrate the viability of a theory of parsing and generation built on commutative transformations. (Author)

AD-A117 842/5 PC **A06**/MF **A01**
Defense Language Inst., Lackland AFB, TX. English Language Center.
Job Language Performance Requirements for Pre-BT Extended English Language Course.
Final rept.,
Tom Molloy. Jul 82, 104p

This report is organized in three main sections. Section I discussed for development of the Job Language Performance Requirements (JLPR). Section II contains the JLPRs grouped by grouped by language skills. Section III contains the JLPRs covering the entire range of clusters/topics. The appendices contain the information on which the JLPRs are based. Appendix One contains a general English word list. This word list is a compilation of the general English terms listed in Appendix Six of the JLPRs for MOS 11B,11C,13B,16D,16P,19D,19E,19F,36C,36K and 72E. Prior to course development, core vocabulary and objective terminology in the Pre-BT Course will be deleted from this list. Appendix Two contain the structural and lexical items that are prerequisite for entry into MOS courses.

AD-A117 850/8 PC **A03**/MF **A01**
Pittsburgh Univ., PA. Learning Research and Development Center.
On the Nature of Verbal Rules and Their Use in Problem Solving.
Technical rept.,
Seth Chaiklin. 12 May 82, 42p Rept no. TR-ONR-APS-9
Contract N00014-79-C-0215

This paper develops the idea of a verbal rule as a propositional plan for performance. The first section dis-

cusses the psychological properties of verbal rules, the information contained in them, and shows, via a computational model, that 4 additional kinds of knowledge are needed to make them operational. The second section reports 5 principles about verbal rules that were derived from an empirical study of the use of verbal rules in problem solving. The first principle is that correct problem solving with verbal rules depends on an interaction between available parsing procedures and available verbal rules. Selection of rules can be affected by difficulty in executing parsing procedures and by verbal labies associated with the rule and the problem domain. Second, parsing difficulties can interface with successful execution of verbal rules. Third, mental procedures constructed from verbal rules can be structurally different from the instructed verbal rules, and may include knowledge from related domains not included in the instruction. Fourth, verbal rules tend to be used optionally and drop out of performance when a person becomes skilled. The final principle shows that verbal rule use can reappear when appropriate mental procedures are unavailable. A brief closing comment is made about the relation between verbal rules and plans in general. (Author)

5H. Man-Machine Relations

AD-A117 608/0 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
Zero-Crossings and Spatiotemporal Interpolation in Vision: Aliasing and Electrical Coupling between Sensors.
Memorandum rept.,
T. Poggio, H. K. Nishihara, and K. R. K. Nielsen. May 82, 50p Rept no. AI-M-675
Contract N00014-75-C-0643, Grant NSF-MCS79-23110

We will briefly outline a computational theory of the first stages of human vision according to which; (a) the retinal image is filtered by a set of centresurround receptive fields (of about 5 different spatial sizes) which are approximately bandpass in spatial frequency; and (b) zero-crossings are detected independently in the output of each of these channels. Zero-crossings in each channel are then a set of discrete symbols which may be used for later processing such as contour extraction and stereopsis. A formulation of Logan's zero-crossing results is proved for the case of Fourier polynomials an extension of Logan's theorem to 2-dimensional functions is also proved. Within this framework, we shall describe an experimental and theoretical approach (developed by one of us with M. Fahle) to the problem of visual acuity and hyperacuity of human vision. The positional accuracy achieved, for instance, in reading a vernier is astonishingly high, corresponding to a fraction of the spacing between adjacent photoreceptors in the fovea. Stroboscopic presentation of a moving object can be interpolated by our visual system into the perception of continuous motion; and this 'spatiotemporal' interpolation also can be very accurate. It is suggested that the known spatiotemporal properties of the channels envisaged by the theory of visual processing outlined above implement an interpolation scheme which can explain human vernier acuity for moving targets.

AD-A117 751/8 PC **A02**/MF **A01**
Air Force Aerospace Medical Research Lab., Wright-Patterson AFB, OH.
A Study on Human Tracking Performance in a Complex G Field Experiment.
Journal article,
Daniel W. Repperger, Dana B. Rogers, John W. Frazier, and Robert E. Van Patten. 1982, 10p Rept no. AFAMRL-TR-81-75
Pub. in IEEE Transactions on Systems, Man, and Cybernetics, vSMC-12 n3 p393-401 May/Jun 82.

No abstract available.

N82-27985/2 PC **A03**/MF **A01**
Forschungsinstitut fuer Anthropotechnik, Bonn (Germany, F.R.).
Design and Validation of a Tracking Test for Forming Matched Groups for Continuous Tracking Experiments.
F. D. Pitrella, and W. Krueger. Aug 81, 29p FB-49
In English; Germany Summary.

A tracking performance test was developed and used in forming matched groups. The need for such a matching test and the advantages of matched groups over randomized groups of subjects in experimental designs are discussed as well as the preference for between-subjects over within-subjects designs. Matching test reliability was measured (0.99) and predictive and matching validities were determined in a validation experiment. Validation coefficients of 0.79 were obtained which are considerably higher than necessary to prefer matched groups to randomized groups. The strategy used in developing this matching test is explained and may be useful to those who wish to develop their own matching tests for specific research purposes.

N82-27986/0 PC **A09**/MF **A01**
United Technologies Corp., East Hartford, CT.
Study of EVA Operations Associated with Satellite Services.
Final Report, Aug. 1981 - Jan. 1982.
J. O. Nash, and R. D. Wilde. Apr 82, 176p NASA-CR-167614, NAS 1.26:167614
Contract NAS9-16120

Extravehicular mobility unit (EMU) factors associated with satellite servicing activities are identified and the EMU improvements necessary to enhance satellite servicing operations are outlined. Areas of EMU capabilities, equipment and structural interfaces, time lines, EMU modifications for satellite servicing, environmental hazards, and crew training are vital to manned Eva/satellite services and as such are detailed. Evaluation of EMU capabilities indicates that the EMU can be used in performing near term, basic satellite servicing tasks; however, satellite servicing is greatly enhanced by incorporating key modifications into the EMU. The servicing missions involved in contamination sensitive payload repair are illustrated. EVA procedures and equipment can be standardized, reducing both crew training time and in orbit operations time. By standardizing and coordinating procedures, mission cumulative time lines fall well within the EMU capability.

N82-27987/8 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Huntsville, AL. George C. Marshall Space Flight Center.
The Human Role in Space.
S. B. Hall, G. Vontiesenhausen, and G. W. Johnson. Apr 82, 37p NASA-TM-82482, NAS 1.15:82482

Requirements for the future human role in space are considered. Human tasks were divided into normal scheduled activities, unscheduled activities, and contingency activities. A strawman mission model was developed. Projections were made of crew size, mission duration, pressurized spacecraft volume, and power requirements. Trends of human roles were likewise projected.

5I. Personnel Selection, Training, and Evaluation

AD-A117 365/7 PC **A09**/MF **A01**
Rutgers - The State Univ., New Brunswick, NJ. Lab. for Computer Science Research.
The Recognition of Instructional Strategies in the Modelling of Student Acquisition of Problem-Solving Skills.
Final rept. 1 Sep 79-31 Aug 81,
Robert Smith, Phyllis Walker, and Peter Spool. May 82, 182p
Contract N00014-79-C-0780

Most scientific and technical instruction relies heavily on the use of examples and exercises to teach domain-relevant problem-solving skills. Little is known, however, about the relationship between the structure of such curricula and the learning abilities and strategies students must have for effective learning. The research reported here has explored how learning occurs when a student is presented structured sequences of exercises in a teaching situation. The approach has been to develop a computer simulation model of a prototypical student learning how to prove theorems in elementary logic. The simulation is based on an actual computer-assisted instruction (CAI) curriculum of exercises used to teach human students at the university level. The focus in the simulation has been to obtain good performances, in terms of acquiring problem-solving skills, by relying as much as possible on a model of how the student interprets the sequence of exercises in the curriculum. We have identified a small number of principles used in creating such sequences, and have demonstrated algorithms for recognizing the sequences in order to drive the acquisition by the simulated student. The work has implications for the design of computer-based learning systems and models. In addition, the work provides a framework for understanding the incremental development of problem-solving skills in students.

AD-A117 377/2 PC **A03**/MF **A01**
Illinois Univ. at Urbana-Champaign. Computer-Based Education Research Lab.
Rule Space, the Product Space of Two Score Components in Signed-Number Subtraction: An Approach to Dealing with Inconsistent Use of Erroneous Rules.
Research rept.,
Kikumi K. Tatsuoka, and Robert Baillie. Mar 82, 45p
Rept no. CERL-RR-82-3-ONR
Contract N00014-79-C-0752

Students responses to a 40-item test on signed-number subtraction are viewed as consisting of two different components, the sign and absolute value parts. Each component is scored zero-one for wrong or correct of the corresponding part of the answer. The traditional scoring yields a score of one only when both components have scores of one. By taking the values of the extended caution index for the absolute value component as the x-axis and those for the sign component as the y-axis, all pairs of component patterns produced by consistent or inconsistent application of various rules or random errors are mapped into the ECI product space. A simulation study showed that the response patterns generated by changing the binary score of any one item in the response patterns of an erroneous rule cluster together in the ECI product space. Moreover, the response patterns resulting from the same kind of misconceptions fall closer together than those resulting from very different kinds. This property of the ECI product space opens up a promising way to handle large numbers of 'bugs' or rules quantitatively. But the ECIs are not defined in the cases of perfect or zero scores. Typically, there are many incomplete rules (e.g., all signs of the responses are right but absolute value parts are taken by some erroneous rule). (Author)

AD-A117 421/8 PC **A02**/MF **A01**
Army Research Inst. Field Unit, Fort Sill, OK.
Modeling Weapons Crew Performance.
Conference paper,
Lloyd M. Crumley, and Robert C. Schwalm. 18 Jun 82, 15p
Paper from the Proceedings of the Army Sciences Conference (1982), 15-18 Jun 82.

The ARI Crew Performance Model can be used as an analytic tool for evaluating the effects of crew structure on performance. Whether used with developing systems or systems in the field, the model can be of value in determining the effects of changes in crew size and the assignment of tasks on the relative efficiency of varying crew structures. However, before the model can be fully utilized, particularly when crew performance in a realistic battlefield scenario is being considered, a great deal of work remains to be done to determine the effects on human performance of extended, continuous performance under conditions of high work/low rest periods.

AD-A117 423/4 PC **A02**/MF **A01**
Army Research Inst. Field Unit, Presidio of Monterey, CA.
Design of a Small Unit Drill Training System.
Conference paper,
Jack H. Hiller, G. David Hardy, Jr., and Larry L. Meliza. 18 Jun 82, 15p
Paper from the Proceedings of the Army Sciences Conference (1982), 15-18 Jun 82.

Combat readiness is critically dependent on unit training programs which units have difficulty in constructing and executing in a straight-forward, efficient manner. Cutbacks in TRADOC resources for resident institutional training have placed a heavy individual-soldier-training load on units, whereas units traditionally have concentrated on collective training which builds on those individual skills imparted at the schools and training centers. Furthermore, the collective-training

load in units has itself effectively grown through adoption of the relatively unstructured Army Training and Evaluation Program (ARTEP), with its many mission- and task-training requirements, in place of the highly structured step-by-step Army training Programs. And all the while, the time available to prepare for and conduct training in units has effectively shrunk for a variety of reasons. This paper first depicts the major problems confronting combat unit training, and then describes a significant unit training innovation recently designed by ARI.

AD-A117 454/9 PC **A03**/MF **A01**
Air Force Occupational Measurement Center, Randolph AFB, TX.
Missile Facilities (WS-133B, WS-133A/M) Career Ladder, AFSCs 44530G, 44550G, and 44570G.
Job inventory.
May 81, 44p

No abstract available.

AD-A117 471/3 PC **A02**/MF **A01**
Human Engineering Lab., Aberdeen Proving Ground, MD.
Human Engineering Laboratory Aviation Supply Class III/V Materiel (HELAVS III/V) Field Test.
Conference paper,
Alan M. Poston, Paul F. Garrett, Jr., William B. DeBellis, Harry J. Reed, and John M. Garinther. 18 Jun 82, 15p
Paper from the Proceedings of the Army Sciences Conference (1982), 15-18 Jun 82.

The experimental objective was to obtain human performance data on helicopter refueling and rearming procedures. The data consisted of time measurements while refueling the helicopter and rearming the HELLFIRE missiles and 2.75-inch rockets. The experiment addressed the effects of crew size, day/night operations, and chemical/biological protective equipment on the refueling and rearming operations. A second objective was to develop test methodologies which could be applied to the Aviation Performance Assessment in a Chemical Environment (APACHE) field study. An additional objective was to evaluate the Division '86 Table of Organization and Equipment (TOE) staffing levels related to FARP operations. This data will assist the US Army Training and Doctrine Command in developing realistic TOEs for future attack helicopter units. It can be concluded that all three conditions evaluated did have an impact on rearming and refueling times. The crew-size change appears to have the most impact, followed by the day/night condition, and then the wearing of CB protective clothing.

AD-A117 500/9 PC **A10**/MF **A01**
Coast Guard, Yorktown, VA. Reserve Training Center.
An Evaluation of Leadership and Management Training in the United States Coast Guard.
Doctoral thesis,
Stephen B. Wehrenberg. 6 Jul 82, 203p Rept no. USCG-P-82-3

This study evaluates the United States Coast Guard Leadership and Management training program, its development, impact on graduates, interface with the work environment, and its future. Section One outlines the evolution of management theory, and leadership and management training, both in a general sense and specific to the Coast Guard Section Two is a critical analysis of the structured organizational rewards, their administration, and their perceived impact. Section Three is a report of an eighteen month field study of the current program's impact on reaction, attitude, cognition, behavior, and performance of graduates and an untrained control group. The only significant differences measured between graduates and the untrained supervisors were related to reaction (enthusiasm) and attitude. No behavioral or performance differences were observed. The final section reflects on some of the potential reasons for the lack of impact of the training, discusses a unified theory of individual change, and makes recommendations for the future of leadership and management training in the Coast Guard. (Author)

AD-A117 508/2 PC **A05**/MF **A01**
Embry-Riddle Aeronautical Univ., Daytona Beach, FL. Aviation Research Center.
Pilot Judgment Training and Evaluation. Volume 1.
Final rept. Jun 81-Mar 82,
J. I. Berlin, E. V. Gruber, C. W. Holmes, P. K. Jensen, and J. R. Lau. Jun 82, 98p DOT/FAA/CT-82/56-1
Contract DOT/FA-79NA-6040
See also Volume 3, AD-A117 509.

The evaluation experiment was conducted using three groups. The experimental group received a written pretest, judgment ground and flight training, a written posttest, and an observation flight at the completion of the training. The flight control group received only the post-training observation flight. The academic control group received the written pretest and posttest along with the experimental group. The resulting data indicated statistically significant differences between the performance of experimental and control group subjects. This was true both in acquisition of judgment concepts as measured by written tests and in the skills performance as measured during the observation flights. Two limitations to the judgment program's generalizability are the relative homogenity of the subjects and the compressed nature of the training time utilized. The associated volumes of the document are Volume II - Student Manual, and Volume III-Instructor Manual. (Author)

AD-A117 509/0 PC **A07**/MF **A01**
Embry-Riddle Aeronautical Univ., Daytona Beach, FL. Aviation Research Center.
Pilot Judgment Training and Evaluation. Volume III.
Final rept. Jun 81-Mar 82,
J. I. Berlin, E. V. Gruber, C. W. Holmes, P. K. Jensen, and J. R. Lau. Jun 82, 143p DOT/FAA/CT-82/56-3
Contract DOT/FA-79NA-6040
See also Volume 1, AD-A117 508.

This manual explains how the flight instructor is to present the judgment training to the students, outlines the content of the Student Manual, presents two sets of lessons for the instructor to conduct during flight training, and contains support materials for the instructor. The Introduction discusses the instructor's role as a coach of learning and the value of using behavior modification in teaching. Units I, II, and III are teaching outlines for parallel units in the Student Manual presenting judgment concepts, behavioral aspects and applications of judgment training. Units IV and V contain instructor initiated exercises designed to develop, focus, and reinforce the student's judgment-making abilities during flight training activities. Unit VI recites basic management principles of the judgment training course, and the Appendices contain various forms and other instructional support documents. The associated volumes of the document are Volume I--Technical Summary, and Volume II--Student Manual. (Author)

AD-A117 534/8 PC **A02**/MF **A01**
Alfred P. Sloan School of Management, Cambridge, MA.
Problems and Opportunities for the Maturing Engineer.
Interim technical rept.,
Lotte Bailyn. Jun 82, 15p Rept no. TR-ONR-6
Contract N00014-80-C-0905
Presented at Electro/82, 25 May 82, Boston, MA.

This paper discusses the problems of maturing engineers in terms of two opposing myths about them, an academic myth and an industrial myth. It argues that both myths lead to procedures that cause stagnation in engineering careers. It describes stagnation in terms of four typical characteristics of engineering jobs, and suggests that organizations might overcome this problem by changing their policy of work assignments and by developing appropriate career paths and rewards for technical professionals. (Author)

AD-A117 540/5 PC **A05**/MF **A01**
Naval Postgraduate School, Monterey, CA.
A Simulator Evaluation of Pilot Response to Low Frequency Aircraft Vibration with Audio Feedback.
Master's thesis,
Michael Wayne Mentas. Mar 82, 93p

An aircraft simulator facility employing a two-axis air combat manuvering simulation with whole body virbational mode capability was used to investigate pilot response to vibration and the performance enhancement technique of audio feedback cuing. The reliability of pilot response to a tracking task was measured in both the nonvibrational and vibrational mode with audio feedback cuing as a primary stimulus in testing. In general, performance scores in all modes of testing were improved using aural tracking techniques with a significant reversal of the adverse vibration stress duration function above expected values. Detailed conclusions and recommendations are presented. (Author)

AD-A117 548/8 PC **A03**/MF **A01**
Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
Retraining Army Aviators Following a Protracted Absence from Flying.
Research rept.,
Martin F. Allnutt, and Carl D. Everhart. Oct 80, 43p Rept no. ARI-RR-1296

A group of Individual Ready Reserve (IRR) Utility Helicopter (UH-1) aviators who had not flown for several years was retrained by Army Research Institute (ARI) instructor pilots at the United States Army Aviation Center (USAAVNC). The main emphasis of the training program was on daytime contact maneuvers, the evaluation of which was carried out by Standardization Instructor Pilots (SIPs) for USAAVNC. Conclusions are drawn about the optimum nature and content of the training program, the hours required to reach a satisfactory standard, and the relationship between the training hours required, total flying time and years away from flying. (Author)

AD-A117 549/6 PC **A04**/MF **A01**
Canyon Research Group, Inc., Westlake Village, CA.
An Experiment to Evaluate the Training Potential of the Pilots' Night Training Device.
Research rept.,
Colin D. Ciley, Jr., and Martin F. Allnutt. Sep 79, 55p ARI-RR-1297
Contract DAHC19-77-C-0059

Various constraints on low altitude night flight have acted to restrict the ability of Army aviation unit commanders to train their aviators in the essential pilot skills required for successful night terrain flight. Use of the Pilots' Night Training Device (PNTD) which attenuates daylight and simulates the night visual scene was tested in a controlled training situation. The posttest performance of two matched groups of Army aviators, one trained at night and the other trained using the Device during the daytime, was compared. (Author)

AD-A117 550/4 PC **A06**/MF **A01**
Canyon Research Group, Inc., Westlake Village, CA.
Development and Evaluation of the Tactical Premission Planning Training Module.
Research rept.,
Ronald Cox, and John W. Ruffner. Jun 80, 125p ARI-RR-1287
Contract DAHC19-77-C-0059

The purpose of this research was to develop a training module for tactical premission planning and to evaluate this module in a field setting. As a result of developmental activities the module contained three components which enabled an aviator to identify tasks to be considered in premission planning, to determine how to accomplish each task, and to assess premission planning performance. The evaluation of the module was conducted in two air cavalry units. Half the aviators in each unit were given the opportunity to use the module.

AD-A117 551/2 PC **A22**/MF **A01**
Kinton, Inc., Alexandria. VA.
Handbook for Action Officers and Training Developers for New Materiel Systems.
Final rept.,
C. Dennis Fink, William A. Carswell, Stanley J. Kostyla, and Robert M. Carroll. Aug 81, 512p ARI-RP-81-30
Contract MDA903-80-C-0272

This Handbook is designed to provide guidance to TRADOC System Managers (TSMs) and training system action officers (AOs) on training information acquisition and input requirements of the Life Cycle Systems Management Model (LCSMM) for Army Systems. The handbook describes the relationship between the Integrated Personnel Support (IPS) management model and the LCSMM and identifies the major sources of input data and information required to accomplish key Integrated Personnel Support activities as specified in TRADOC Regulation 600-4. (Author)

AD-A117 553/8 PC **A06**/MF **A01**
Information Spectrum, Inc., Arlington, VA.

Integration of Manpower, Personnel, and Training Issues from the Materiel System Acquisition Process Into the Planning Programming and Budgeting System.
Final technical rept.,
Fredrick L. Friedman, Alfred S. Rhode, and Francis E. O'Connor. Mar 81, 111p ARI-TR-526
Contract MDA903-79-C-0637

This publication describes the integration of the materiel systems acquisition process into the Planning, Programming, and Budgeting System (PPBS). The report discusses the manpower, personnel, and training (MPT) information requirements of the materiel systems acquisition process as they relate to the entry points of the PPBS. The report also identifies timing for the integration of required data and provides recommendations for updating procedures. (Author)

AD-A117 554/6 PC **A04**/MF **A01**
Canyon Research Group, Inc., Westlake Village, CA.
Development and Testing of the Map Interpretation, Terrain Analysis, and Navigation at Night Program of Instruction (MITANN POI).
Research rept.,
Bruce A. Smith. May 80, 51p ARI-RR-1311
Contract DAHC19-77-C-0008

There is a critical requirement for conducting Army combat flight operations at terrain altitudes (including nap-of-the-earth (NOE)) at night. Current courses of instruction are inadequate in training for the accomplishment of that requirement. This report describes the development of a course that will provide instruction to assist in meeting that requirement. This course is developed to be a night navigation and map/terrain interpretation course using unaided (naked eye) and aided (Night Vision Goggles) vision techniques (MITANN). (Author)

AD-A117 555/3 PC **A12**/MF **A01**
Systems Technology, Inc., Mountain View, CA.
Determination of Motion and Visual System Requirements for Flight Training Simulators.
Final rept.,
Robert K. Heffley, Warren f. Clement, Robert F. Ringland, Wayne F. Jewell, and Henry R. Jex. Aug 81, 253p STI-TR-546, ARI-TR-546
Contract MDA903-80-C-0235

Fidelity requirements for Army flight training simulators are explored using a manual control theory approach. The first step is to define 'simulator fidelity' in operational terms which provide a basis for each of the subsequent steps. This definition is accompanied by a taxonomy of measurable fidelity parameters. The next step, also of a preparatory nature, is the analysis of Army flight training missions. (Author)

AD-A117 558/7 PC **A05**/MF **A01**
Naval Postgraduate School, Monterey, CA.
An Application of Discriminant Analysis to the Construction of a Performance Index for Marine Officers.
Master's thesis,
William Joseph Haffey. Mar 82, 96p

This study consists of a discriminant analysis of composite marks for 23 selected categories in section B of the Marine Corps fitness report. The data for the study were taken from all the fitness reports on record for those officers in the grades of Captain, Major, and Lieutenant Colonel who appeared before promotion boards during FY81.

AD-A117 584/3 PC **A02**/MF **A01**
Navy Personnel Research and Development Center, San Diego, CA.
The Reallocation of Military Pay Increases.
Final rept. Jul 81-Nov 81,
Walter W. Wilcox. Jun 82, 17p Rept no. NPRDC-TR-82-49

Pay reallocation and pay targeting are administrative mechanisms available to the Executive Branch for the manipulation of the overall size or relative distribution of military pay increases. To better understand the budgetry and pay rate consequences of reallocation, NAVPERSRANDCEN constructed a computer-based model called REALL. (Author)

AD-A117 630/4 PC **A05**/MF **A01**
Navy Personnel Research and Development Center, San Diego, CA.
Independent Research and Independent Exploratory Development at the Navy Personnel Research and Development Center--FY81.
Special rept.,
Bernard Rimland. Jun 82, 83p Rept no. NPRDC-SR-82-27

This report provides synopses of FY81 IR/IED (Independent Research/Independent Exploratory Development) projects, the IR/IED funding profile, and a list of publications and presentations on IR/IED projects. It also includes extended articles on IR or IED efforts that have been developed over several years.

AD-A117 667/6 PC **A09**/MF **A01**
Embry-Riddle Aeronautical Univ., Daytona Beach, FL. Aviation Research Center.
Pilot Judgment Training and Evaluation. Volume II.
Final rept. Jun 81-Mar 82,
J. I. Berlin, E. V. Gruber, and C. W. Holmes. Jun 82, 181p DOT/FAA/CT-82/56-2
Contract DOT-FA79NA-6040
See also Volume 3, AD-A117 509.

This manual contains instructional material for student use in conjunction with the pilot judgment training program. It contains 18 lessons which are divided into three units. Unit I presents terms and concepts designed to develop modified patterns of thinking and to give students and instructors the most objective means possible for discussing pilot behavior. Unit II addresses behavioral aspects of judgment, including hazardous thoughts and stress. Unit III relates the learning of Units I and II to actual flight situations using scenarios based on actual pilot accident reports. This manual is intended as a training aid and workbook requiring a minimum of supplemental teaching by the flight instructor.

AD-A117 681/7 PC **A03**/MF **A01**
Navy Personnel Research and Development Center, San Diego, CA.
Instructional Quality Inventory: Usability of Procedures.
Technical rept. Aug 79-Jun 81,
H. W. Stern, and P. S. Fredericks. Jun 82, 29p Rept no. NPRDC-TR-82-46

The purpose of this effort was to evaluate the instructional quality inventory (IQI), which was developed to supplement the instructional systems development procedures used for training development by all three military services. A two-person team with limited experience in the IQI process used IQI to analyze an instructional module from the Radioman (RM) A School, and revised the module to correct deficiencies found. To determine the effectiveness of the revised module, two groups of students were selected. The first group (standard) received the original materials; and the second group, the IQI-revised materials. Results showed that the IQI provided a useful framework for identifying deficiencies in current instruction and that students using IQI-revised materials scored higher on job-relevant tests that did those using standard materials.

AD-A117 685/8 PC **A03**/MF **A01**
Intelligent Software Systems, Inc., Amherst, MA.
The Development of an Intelligent, Trainable Graphic Display Assistant for the Decisionmaker.
Final rept.,
Alan C. Morse, Ralf Kohler, and Michael Sutherland. 26 Jul 82, 29p
Contract N00014-82-C-0136

This report describes the top-level design of a trainable, intelligent graphics workstation, which is designed to assist desisionmakers to understand and analyse large amounts of data. The system has three key features: it is personalizable, it has facilities for the graphical presentation of data in a wide variety of formats; and it contains a user-programmable event monitor, which automatically searches the data for user-defined patterns. When such a pattern is found, a corresponding user-defined action is triggered. The system was partially implemented and tested experimentally. The experiments attempted to test the key features of the system. The results indicated that the ability to present data in a variety of formats is desirable. Also, the results indicated that the event monitor was potentially a useful aid; however, these results were more ambiguous because of a high degree of inter-subject variability. The report concludes that such a system would be highly effective and that the design is feasible. (Author)

AD-A117 700/5 PC **A02**/MF **A01**
Navy Personnel Research and Development Center, San Diego, CA.
Marine Corps Job Performance Test for Three Enlisted Specialties.
Final rept. 1 Oct 80-30 Sep 81,
David J. Chesler, Chester R. Bilinski, and Marc A. Hamovitch. Jun 82, 22p Rept no. NPRDC-TN-82-20

Hands-on and written job performance tests were developed for three Marine Corps enlisted specialties: rifleman (MOS 0311), organizational automotive mechanic (MOS 3521), and ground radio repairer (MOS 2841). The tests were field tested to assess reliability and logistical feasibility. Headquarters, Marine Corps and the Marine Corps Operations Analysis Group will use these tests to determine the feasibility of validating the Armed Services Vocational Aptitude Battery (ASVAB) against job performance and extending the effort to additional specialties. (Author)

AD-A117 716/1 PC **A03**/MF **A01**
RAND Corp., Santa Monica, CA.
Enlistment Effects of Military Educational Benefits.
Interim rept.,
J. Michael Polich, Richard L. Fernandez, and Bruce R. Orvis. Feb 82, 44p Rept no. RAND/N-1783-MRAL
Contract MDA903-80-C-0652

text of a briefing on a nationwide experiment offering special educational benefits for military enlistees. In 1981 the Department of Defense offered four Congressionally mandated benefit programs in balanced sets of geographical areas to test the effects on enlistments by 'high quality' youth. Rand analyzed the experimental data and results from two national surveys to evaluate the programs. The briefing reports that educational benefits can increase enlistments substantially, but that a uniform benefit offered to all recruits could have undesired effects, such as reducing enlistments in the Army and in combat specialties. Results imply that a benefit program targeted on specific subgroups can improve manning in hard-to-fill occupational specialties, while at the same time increasing the overall number of high-quality recruits. (Author)

AD-A117 717/9 PC **A09**/MF **A01**
National Cryptologic School, Fort George G. Meade, MD.
Text and Workbook in Advanced Russian Grammar and Syntax,
Maureen A. Baginski. 2 Sep 81, 182p

This workbook builds on the elementary and intermediate level Russian grammar and syntactic usage covered in earlier phases of the course. The purpose of the workbook is to provide the student with an in-depth explanation of selected Russian grammatical forms and selected syntactical usages. The explanations and exercises are designed to promote the student's analytical skills in either independent study or instructor-assisted instruction. (Author)

AD-A117 750/0 PC **A08**/MF **A01**
Air Force Academy, CO.
The Republic of Korea: Intercultural Education and the Nevada Air National Guard (Team Spirit '82).
Final rept.,
William A. Mitchell. Jul 82, 165p Rept no. USAFA-TR-82-2

This research is based on a program by an interdisciplinary faculty of the USAF Academy. It was conducted in February 1982, and designed to prepare the 152nd Tactical Reconnaissance Group for its deployment to Taegu, Korea (Team Spirit '82). The program emphasized basic knowledge about the culture of Korea (including geography, history, politics, law, religion and language) and emphasized the importance of developing a positive attitude about our ally by providing accurate knowledge about Korea to increase sensitivity toward its people. (Author)

AD-A117 805/2 PC **A03**/MF **A01**
Rowland and Co., Haddonfield, NJ.
Instructor/Operator Station Design Study.
Final rept. 26 Aug 81-26 Apr 82,
William M. Hinton, Jr., and Walter M. Komanski. Apr 82, 46p NAVTRAEQUIPC-80-D-0009-1
Contract N61339-80-D-0009

The goal of the study was to develop generic Instructor/Operator Station designs which would improve the

instructor's ability to carry out his instructional repsonsibilities during simulation training. Current Instructor/Operator Station designs were assessed and their strengths and weakness evaluated. Design principles were developed to enhance the strengths and eliminate the weaknesses. Two alternative generic Instructor/Operator Station designs are presented. The designs are comparable in training capability. They differ in their methods of instructor control. Alternative 1 features almost exclusive of CRT touch panels. Alternative 2 features a mixture of CRT touch panels and panel-mounted electronic touch pads. Advantages and disadvantages of each alternative are presented. (Author)

AD-A117 867/2 PC **A04**/MF **A01**
Washington Headquarters Services (DOD), DC. Directorate for Information Operations and Reports.
Department of Defense Military Manpower Statistics.
Apr 82, 56p

MILITARY MANPOWER STATISTICS (MMS) is a monthly publication prepared by the Washington Headquarters Services, Directorate for Information Operations and Reports (WHS/DIOR) of the Office of the Secretary of Defense. The MMS report presents audited statistical data pertaining to military personnel on active duty and personnel in military reserve components, for the current fiscal year on a monthly basis. The March, June, September, and December issues contain quarterly summaries of certain military manpower data as annotated in the Table of Contents. Although these tables are revised quarterly, they are published without changes in two subsequent monthly editions of this publication. The publication is generated from a computerized data base developed and maintained by the Manpower Management Information Division of WHS/DIOR.

AD-A117 886/2 PC **A03**/MF **A01**
Leadership and Management Development Center, Maxwell AFB, AL.
Management Challenge for the Early 1980's.
Student rept.,
Joseph T. Irwin. 1980, 40p

The USAF has a substantial loss of experience which is not being replaced as fast as management might desire. This situation can be overcome through complementary training policies. First, continue to pursue established training methods. Since course demand exceeds supply, other procedures are required. Secondly, pursue an unconventional form of training that involves a team of experts and trainees--personnel detailed to an organization as a rotational team of working consultants. They would train the organization's resident incumbents and accomplish certain assigned tasks. Upon completion of the task, individual team members (analyst or trainee) could be selectively retained in the 'visited' organization. This method of work training will integrate orientation and overview training, formal classroom instruction, on-the-job training, and further implement the Resource Management Team concept within the Comptroller Community.

AD-A117 920/9 PC **A08**/MF **A01**
Information Spectrum, Inc., Arlington, VA.
Aviation Officer Requirements Study.
Final rept.,
F. E. O'Connor. 31 May 82, 169p Rept no. ISI-V-2693-01
Contract N00014-81-C-0368

A model is presented which develops Aviation Officer Requirements at the sub-community level within the constraints imposed by a network of permissible career paths specified by the user. The model is currently implemented in a WANG 2200 V computer in a 'User-Friendly' interactive mode. The user can quickly make multiple runs, varying a number of parameters, to test the implications of various policy alternatives on Aviation Officer Requirements. Demonstration of model application and a model user's guide are included. (Author)

AD-A117 923/3 PC **A02**/MF **A01**
Naval Health Research Center, San Diego, CA.
Work Group Interdependence and Role Conflict and Ambiguity: Identifying Sources of Job-Related Stress.
Interim rept.,
Mark C. Butler, James M. LaRocco, and Allan P. Jones. Aug 79, 14p Rept no. NAVHLTHRSCHC-79-33

As the impact of job stressors such as role conflict and role ambiguity becomes more apparent, social scientists have attempted to delineate potential moderating influences that might protect the worker from the stresses of the job. Considerable evidence exists which suggests that the nature of leader-subordinate and workgroup interactions are linked to the influences of stress. The present study postulated that leader practices would be more important in reducing job stress (role conflict and ambiguity) in workgroups involved in highly interdependent and cooperative tasks than for those who are not.

AD-A117 934/0 PC **A04**/MF **A01**
Air Force Occupational Measurement Center, Randolph AFB, TX.
Disaster Preparedness Career Ladder (AFS 242X0). Disaster Preparedness Utilization Field (AFS 05XX).
Occupational survey rept.
Jul 82, 64p

Inventory booklets were administered to 05XX and 242XO Disaster Preparedness incumbents worldwide. Survey results are based on responses from 488 incumbents or 77 percent of eligible assigned members. There was considerabvle similarity among jobs in the disaster preparedness field and substantial overlap in officer and enlisted jobs. Twelve job types were identified. They divided into two clusters of four job types each and four independent job types. There were few tasks uniquely performed by members of any of the job groups. Three- and five-skill level personnel performed mostly technical tasks. The seven-skill level through CEM code personnel reflected decreasing emphasis on technical tasks and increasing emphasis on supervisory and managerial tasks. Of particular interest was the large amount of time spent on training by most enlisted disaster preparedness personnel. (Author)

DE82011412 PC **A05**/MF **A01**
Oak Ridge Associated Universities, Inc., TN.
Nuclear-Related Training and Education Offered by Nonacademic Organizations.
L. Howard. Feb 82, 100p ORAU-195
Contract AC05-76OR00033
Portions of document are illegible.

The results of a survey of nonacademic organizations providing nuclear-related training and education are presented in this report. The survey instrument was distributed by the Institute of Nuclear Power Operations (INPO) to 136 training organizations. The scope of the survey was not intended to be comprehensive, but rather to include the primary sources of nonacademic nuclear-related training and education offered to utility personnel. The survey universe was compiled from training organizations listed in the 1981 Nuclear News Buyer's Guide. (ERA citation 07:046645)

ED-200 225 Not available NTIS
Pennsylvania Library Association, Pittsburgh.
A Directory of Library Instruction Programs in Pennsylvania Academic Libraries,
Joseph J. Costa. Apr 80, 42p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

This directory of library instruction programs in 102 libraries adds information on in-house developed library instruction materials to the basic information on programs, program content, and instructional personnel listed in the previous edition. Survey information gathered for the directory provides statistical data on the form of library instruction, the use of print and nonprint materials, subject areas specifically addressed at each institution, and responses to questions regarding the administration and organization of library instruction. The responses are summarized in an alphabetical listing of institutions. Following the alphabetical listing is an index by questionnaire topics.

ED-200 227 Not available NTIS
Nebraska Univ., Lincoln.
Videodisc: An Instructional Tool for the Hearing Impaired,
George Propp. 1980, 43p
Contract 0E-300-77-0430
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

The strong potential of videodisc technology for improving the education of the hearing impaired is described in this report on the Media Development Project for the Hearing Impaired (MDPHI) at the University of Nebraska. The topics covered include: (1) the history of the use of technology in deaf education; (2) the history of videodiscs and their capabilities; (3) a comparison of the optical and capacitance systems of videodiscs; (4) an overview of the systems currently being produced; (5) a description of the instructional design, development, and evaluation efforts carried out by MDPHI on videodisc technology for deaf education; and (6) the production techniques used to edit and caption videodiscs. Extensive bibliographies are included after each chapter.

ED-200 228 Not available NTIS
Association for Educational Communications and Technology, Washington, DC.
Evaluating Media Programs: District and School.
1980, 77p ISBN-0-89240-039-0
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210. Also available from Publications Department, Association for Educational Communications and Technology, 1126 16th St., NW, Washington, DC 20036 (AECT members, $6.95; nonmembers, $6.95).

Designed to provide a framework for systematically collecting data and information about media programs at the building and district levels, this workbook is intended for use as part of a formative evaluation process to accomplish the following goals: (1) assisting the local school district in organizing descriptive data for the purpose of improving its media program, (2) providing descriptive data for use by outside agencies invited to participate in the local planning and evaluation process, and (3) providing an assessment tool for purpose of accreditation.

ED-200 229 Not available NTIS
Information Futures, Pullman, WA.
Instructional Television: Potentials or Problems,
John Pekich. 1979, 44p ISBN-0-131450-15-2
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210. Also available from Information Futures, 2217 College Station, Pullman, WA 99163 ($9.50).

The potential of instructional television (ITV) for creating excitement for learning has been demonstrated by such productions as Mr. Rogers' Neighborhood, The Electric Company, and The Adams Chronicles. However, not all producers have been this successful in merging the capabilities of television with the needs of learners, and a review of the strengths and weaknesses of ITV is in order for both producers and those considering using it. Strengths include the capability of hiring the best available teacher, using a professional production staff to plan quality productions, encouraging good quality teaching, extending appeal to a wide audience, bringing immediacy to learning, preview opportunities, improving classroom teacher and student skills, availability of nontraditional resources, attention control, permanence of lessons, and outreach to parents and homebound students. There are, however, several weaknesses, e.g., scheduling difficulties, lack of direct feedback and group discussions, nonindividualized instruction, and high cost of programming. Ideal television teachers communicate with students, think visually, know the subject, display showmanship, and are flexible. To determine the quality of programming, the producer should be asked specific questions concerning program objectives and content, intended audience, educational qualifications of staff, and proof of the program's effectiveness. An extensive bibliography is provided.

ED-200 230 Not available NTIS
Institution of Electrical Engineers, London (England).
A Review of the IEE's Involvement in Academic Gaming,
H.I. Ellington. Sep 79, 22p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

In partnership with the Institute of Technology in Aberdeen, the Institution of Electrical Engineers (IEE) has pioneered the development of a range of highly sophisticated simulation games and case studies based on realistic engineering scenarios for use in secondary and higher education and industrial training. The initial involvement of IEE in academic gaming through the

'Power Station Game' Project is described, as well as the subsequent development of that project; the Broadcasting Game Project, in which IEE became involved in the actual development of games; and the recent expansion of publication activities with Peter Peregrinus Ltd. (PPL). A discussion of possible future developments concludes the main body of the report. More detailed information is provided in three appendices: the first describes six games published by IEE and PPL; the second lists 41 papers published on the games; and the third indicates conferences and seminars at which the games have been publicized.

ED-200 231 Not available NTIS
Issues in Field Experience as an Element in the Library School Curriculum. A Background Paper,
Margaret E. Monroe. Feb 71, 19p
Paper presented at the Association of American Library Schools, Washington, DC, January 29-February 1, 1981.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

This paper presents some definitions and makes distinctions among therience drawn from the literature, and surveys the goals of librarianship and library education in using field experience as an element in the library school curriculum at the master's level. Further, it explores learning theory for insights on the contributions field experience can make to professional education, identifies typical weaknesses and administrative problems in its implementation, and examines alternatives to a full-fledged field experience program. A bibliography listing more than 60 sources is provided.

ED-200 232 Not available NTIS
Medicine for the Soul,
Mildred C. Tietjen. 1980, 7p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

Sixty-nine American Library Association (ALA) accredited graduate library school progra,s were sirveued tp deter,orne avao;ab;e ;obraru education opportunities in bibliotherapy. The survey revealed that only one school, Catholic University of America, offered a formal bibliotherapy course. Eight institutions indicated that bibliotherapy was handled as a unit within a broader course, six noted that students may elect to pursue bibliotherapy through independent study or special projects, and three reported offering short courses or workshops involving bibliotherapy. Five references are listed.

N82-28041/3 PC **A02**/MF **A01**
Sheffield Univ. (England). Dept. of Control Engineering.
Teaching Programming to Engineers: The Choice of Language.
A. S. Morris. 1981, 12p RR-168

The merits of the major languages presently available for teaching computer programming to engineering students are examined. The ultimate application of programming by engineers is given prominence. This evaluation fills a gap in the information presently available to planners of engineering courses. Recommendations about the best language are made from engineering considerations and offer an alternative to the much less application-orientated criteria typically adopted by university computer science departments.

PAT-APPL-6-374 575 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Helmet Mounted Display Projector.
Patent Application,
Denis R. Breglia, Archer M. Spooner, and Daniel R. Lobb. Filed 3 May 82, 13p AD-D009 564/6
Availability: This Government-owed invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A helmet mounted projector offset and frame scanning capabilities for a dual channel computer generated image simulation system. The projector receives full color lasers from each channel via a separate optical path, including galvanometer controlled line scan offset mirrors designed to provide eye tracking capabilities, and combines said channels along a single optical axis to provide coordinated frame scanning for the complex image produced by the combined rasters. (Author)

PB82-244393 PC **A04**/MF **A01**
Agency for International Development, Washington, DC.
Northern Nigeria Teacher Education Project.
Project impact evaluation no. 23,
Robert E. Mitchell, James M. Seymour, and Howard F. Tuckman. Sep 81, 55p AID-PN-AAJ-173

This document describes the lessons provided by Northern Nigeria Teacher Education Project for the design and implementation of future participant training programs, especially those in the education sector. The authors' major conclusion is that NNTEP's unanticipated effects had a more important and longstanding impact on the leadership and institutional development of the Nigerian education system than did the negligible progress made in improving the quality and efficiency of primary teacher training. After describing the project's history and original objectives, the paper discusses several impediments to the achievement of A.I.D. expectations. For example, the University of Wisconsin (UW), which implemented the project, had insufficient experience and time to devote to curriculum development, despite A.I.D.'s emphasis on this particular component. Nevertheless, the collaborative work on curriculum development between UW and the Ahmadu Bello University Institute of Education (IE) contributed substantially to IE's growth as a major educational resource and influence in the region. Another of NNTEP's major achievements was the development of a regional consensus on examinations and curriculum. A key lesson taught by NNTEP is that the training program's success was largely due to highly motivated trainees, committed mid-career professionals, and host country recognition of the contracted U.S. university as a superior institution. NNTEP also demonstrated, however, that curriculum reform cannot be achieved overnight and, more generally, that technical assistance projects must be designed with realistic implementation schedules and carefully delineated supervisory responsibilities. A.I.D. should show host governments alternative, least-cost solutions to stated policy goals, including one of the most effective of such strategies, participant training. Appendices on evaluation methodology, NNTEP curriculum development, and the expansion and financing of the Nigerian educational system are included.

PB82-250119 PC **A04**/MF **A01**
Faucett (Jack) Associates, Inc., Chevy Chase, MD.
Guidelines and Sample Training Workbook for Police Enforcement of Noise Regulations.
Training workbook.
Feb 80, 59p JACKFAU-78-189-4, EPA/550/9-80/426
Contract EPA-68-01-4701

This document contains materials suitable for use in training police officers to enforce noise control laws. It consists of two courses, one to train officers in enforcing their own specific laws and the second is designed to train instructors at police academies and similar institutions, in conducting the first course. The materials for these courses were culled from a wide selection of laws and regulations enforced, of the procedures followed in their enforcement, of the data and records kept and problems that occurred.

PB82-254012 PC **A03**/MF **A01**
California Univ., San Diego, La Jolla. Inst. of Marine Resources.
California Sea Grant College Program Annual Summary 1980-81,
Kelly E. Anderson. 1982, 39p R-CSGCP-008, NOAA-82070702
See also report for 1978-79, PB80-185762.

This year's summary addresses the need to more effectively communicate the activities and results of the California Sea Grant College Program. Sections are devoted to: marine education and training, marine advisory services, coastal resources, aquaculture research and development, fisheries research and development, new marine products, ocean technology, marine affairs, and rapid response.

PB82-254285 PC **A04**/MF **A01**
Federal Emergency Management Agency, Washington, DC.
Media Ideas Workbook.
Oct 80, 56p FEMA/FA-30

This book is a resource for public fire educators who use or would like to use local mass media in their fire education campaigns. It contains ideas for television public service announcements and supporting print brochures on five major fire education topics.

PB82-257585 PC **A11**/MF **A01**
Portland State Univ., OR. Regional Research Inst. for Human Services.
Child Welfare Training. Permanent Planning in Foster Care: Resources for Training,
Susan Downs, and Catherine Taylor. Nov 80, 247p
DHHS/PUB/OHDS-81-30290
Grant OHDS-84-90555

The volume, with a companion called Permanent Planning in Foster Care: A Guide for Program Planners, represents the final product of a national child welfare training grant. The project was designed to meet a critical educational gap in the field of child welfare for both students and practitioners, at the same time that it augmented the Institute's national technical assistance project in disseminating permanent planning strategies and techniques under contract with the Children's Bureau, Administration for Children, Youth, and Families. The volume represents completion of one of the grant's objectives, the development and dissemination of curricular materials for use in the education and training of students and caseworkers on permanent planning for children in foster care.

5J. Psychology (Individual and Group Behavior)

AD-A117 381/4 PC **A04**/MF **A01**
Pennsylvania Hospital, Philadelphia.
Voluntary Self-Control of Sleep to Facilitate Quasi-Continuous Performance.
Annual summary rept. no. 70, 1 Apr 77-30 Jun 78,
David F. Dinges, Martin T. Orne, Emily Carota Orne, and Frederick J. Evans. Jun 78, 74p
Contract DADA17-71-C-1120

The aim of our research has been to evaluate the potential of napping for facilitating quasi-continuous functioning. Earlier work by this laboratory has isolated individual napping patterns. Replacement nappers are individuals who utilize naps to make up for lost sleep or in anticipation of future sleep loss. Appetitive nappers nap even in the absence of fatigue because they enjoy the experience and derive psychological benefit from the nap. Non-nappers neither nap, nor do they find naps helpful. The current study expands these findings and explores the effect of asking individuals to nap in an environment not conducive to sleep. Further, it examines the effect of naps on performance. The overall thrust is to develop the concept of prophylactic napping as a means of training soldiers to utilize available slack time during quasi-continuous performance to prevent the accumulation of sleep debt, and thus maintain optimal functioning. In this report an updated review of the relevant literature on napping and fragmented sleep is included. Studies are discussed in relation to our approach to the use of napping. Further findings relevant to these issues are presented, including differences in sleep efficiency, delta sleep onset, oral temperature, and the factors that influence the ease of napping.

AD-A117 422/6 PC **A02**/MF **A01**
Army Research Inst. Field Unit, Fort Benjamin Harrison, IN.
The Relationship between Company Leadership Climate and Objective Measures of Personnel Readiness.
Conference paper,
Bruce S. Sterling. 18 Jun 82, 13p
Paper from the Proceedings of the Army Sciences Conference (1982), 15-18 Jun 82.

The purpose of the present research is to examine the relationship between perceptions of company leadership climate (by both leaders and lower enlisted) and objective measures of personnel readiness. However, before such a relationship can be explored, an instrument for examining overall company leadership climate must be constructed. Therefore, a secondary purpose of the research was to construct a valid measure of company leadership climate for both leaders and lower enlisted.

AD-A117 428/3 PC **A04**/MF **A01**
Army Aeromedical Research Lab., Fort Rucker, AL.
Oscillations in the Visual Response to Pulsed Stimuli,
Franklin F. Holly. Jun 82, 63p Rept no. USAARL-82-5

Dunlap (1915) reported a phenomenon in which a single photic pulse, presented in the periphery under mesopic conditions, is perceived as two sequential flashes. The present work indicates that this double-flash effect is but a special case of a class of auto-oscillatory phenomena occurring at a frequency in the neighborhood of 10 Hz. Flicker studies by several investigators (e.g., de Lange, 1958) have indicated a resonance (temporal MTF peak) at approximately 10 Hz. It is believed that the frequency of the oscillatory phenomena described here results from the natural frequency of the network responsible for this peak. It is also believed that these phenomena are related to the oscillatory potentials which have been recorded from retina and cortex. The impetus for this work was provided by the need to explicate certain oscillatory phenomena which had been noted in the course of evaluating proposed lighting systems on new Army helicopters. (Author)

AD-A117 439/0 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
Learning by Augmenting Rules and Accumulating Censors.
Memorandum rept.,
Patrick H. Winston. May 82, 25p Rept no. AI-M-678
Contract N00014-80-C-0505

This paper is a synthesis of several sets of ideas: ideas about learning from precedents and exercises, ideas about learning using near misses, ideas about generalizing if-then rules, and ideas about using censors to prevent procedure misapplication. The synthesis enables two extensions to an implemented system that solves problems involving precedents and exercises and that generates if-then rules as a byproduct. These extensions are as follows: If-then rules are augmented by if-plausible conditions, creating augmented if-then rules. An augmented if-then rule is blocked whenever facts in hand directly deny the truth of an if-plausible condition. When an augmented if-then rule is used to deny the truth of an if-plausible condition, the rule is called a censor. Like ordinary augmented if-then rules, censors can be learned. Definition rules are introduced that facilitate graceful refinement. The definition rules are also augmented if-then rules. They work by virtue of if-plausible entries that capture certain nuances of meaning different from those expressible by necessary conditions. Like ordinary augmented if-then rules, definition rules can be learned. The strength of the ideas is illustrated by way of representative experiments. All of these experiments have been performed with an implemented system.

AD-A117 444/0 PC **A03**/MF **A01**
Vanderbilt Univ., Nashville, TN.
The Effect of Context on Perceived Depth.
Technical rept.,
Robert Patterson, Arthur Menendez, and Robert Fox. Jul 82, 26p Rept no. N14-0001-82C-0002
Contract N00014-81-C-0001

Much of the research on stereopsis, which refers to the perception of relative depth, has been devoted to the testing of hypotheses derived from the geometrical relationships intrinsic to stereoscopic depth perception. Factors not given directly by geometric considerations, yet which may affect stereoscopic depth relationships, have received less attention. This report concerns one such factor, namely the effect of context on the perceived depth positions of stereoscopic forms. Data do exist that suggest the perceived depth position of one stimulus can be influenced by the apparent depth positions of other stimuli. But such an effect has been obtained only under viewing conditions in which many of the cues to distance and depth are absent. In the present study, however, the effect of a large enveloping form on the perceived depth position of a smaller surrounded (test) form was examined when all cues for veridical distance and depth were present. The forms, which were contours formed from dynamic random-element stereograms, were combined factorially in 36 experimental conditions: four levels of context, three viewing distances, and three levels of disparity value. Perceived depth did vary as a function of viewing distance and disparity value in accord with the geometry of stereoscopic space, but not as a function of context.

AD-A117 455/6 PC **A03**/MF **A01**
Illinois Univ. at Urbana-Champaign. Dept. of Psychology.
Perceptions of Supervisor-Subordinate Relations among Hispanic and Mainstream Recruits.
Interim rept.,
Harry C. Triandis, Chi-chiu Harry Hui, Judith Lisansky, Gerardo Marin, and Hector Betancourt. Apr 82, 35p Rept no. TR-ONR-11
Contract N00014-80-C-0407
Supersedes AD-A114 899.

Samples of Hispanic and Mainstream Navy recruits answered a questionnaire that obtained their perceptions of supervisor-subordinate relations. In addition, a number of items measured values related to supervisor-subordinate behaviors such as Power Distance, Uncertainty Avoidance, Collectivism, and Masculinity (Hofstede's, 1980). Evidence was found that the Hispanics were higher than the Mainstream respondents on Power Distance and Uncertainty Avoidance; and lower on Masculinity. There was also a trend suggesting higher Hispanic scores on Collectivism, and descriptions of a sample of supervisory situations suggested a greater tolerance by Hispanics for supervisors who are non-participative (high Power Distance); but there were no preferences for supervisors high in initiating structure and collectivism. Reactions to supervisors high or low on Initiating Structure and Consideration revealed strong similarities between Hispanic and Mainstream recruits. Both samples liked the supervisors high on both traits much more than the supervisors low in both characteristics. However, there was a trend for Hispanics to prefer the high Consideration--low Initiating Structure supervisor more than the high Initiating Structure--low Consideration supervisor.

AD-A117 491/1 PC **A02**/MF **A01**
Army Natick Research and Development Labs., MA.
Psychophysics of Modern Camouflage.
Conference paper,
Alvin O. Ramsley, and Walter G. Yeomans. 18 Jun 82, 15p
Paper from the Proceedings of the Army Sciences Conference (1982), 15-18 Jun 82.

In October 1981 the Army began to issue the new Battle Dress Uniform. The most conspicuous feature of this garment is its Woodland Pattern that was designed to meet the Army's primary camouflage objectives for personnel in temperate regions, day and night, summer and winter. This paper describes the applications of psychophysical principles that led to the development of the Woodland Pattern.

AD-A117 586/8 PC **A03**/MF **A01**
Navy Personnel Research and Development Center, San Diego, CA.
Human Memory Limitations in Multi-Object Tracking.
Interim rept. Jun 80-Nov 81,
Frank L. Greitzer, Richard T. Kelly, and Ramon L. Hershman. Jun 82, 41p Rept no. NPRDC-TR-82-48

Basic perofrmance data were obtained on the effect of critical task variables in unaided multi-object tracking behavior. Six observers viewed computer-generated displays in which five, seven, or nine objects represented targets that moved in random linear trajectories at one of two speeds. Displayed positions were updated six times at intervals of 5, 8, 13 or 18 seconds, and no track history was provided. The task for the observer was to monitor the trajectories and then predict the next position of each object. Results showed that the unaided observer can keep track of up to about seven moving objects. Performance improved as the interval between updates was increased to about 13 seconds. These variables interact in their effects on tracking performance and may be trade off in a complex manner. A family of mathematical models of human memory that focus on the encoding, learning, and rehearsal processes of the observer was developed. Two of the models' predictions were consistent with the data observed and those reported in the psychological literature. The analysis of human memory and information processing limitations should be extended to more complex operational tasks to support system designers with quantitative estimates of operator performance. (Author)

AD-A117 763/3 PC **A02**/MF **A01**
Naval Health Research Center, San Diego, CA.
On Varying Work/Sleep Schedules: Issues and Perspectives as Seen by a Sleep Researcher,
Laverne C. Johnson. 1981, 16p Rept no. NAVHLTHRSCHC-79-45
Pub. in Biological Rhythms, Sleep and Shift Work. Advances in Sleep Research, v7 p335-346 1981.

No abstract available.

AD-A117 764/1 PC **A03**/MF **A01**
Naval Health Research Center, San Diego, CA.
Circadian Cycles and Restorative Power of Naps,
Paul Naitoh. 1981, 32p Rept no. NAVHLTHRSCHC-80-11
Pub. in Biological Rhythms, Sleep and Shift Work. Advances in Sleep Research, v7 p533-580 1981.

No abstract available.

5K. Sociology

AD-A117 610/6 PC **A04**/MF **A01**
Alfred P. Sloan School of Management, Cambridge, MA.
Patterns and Assumptions: The Keys to Understanding Organizational Cultures.
Interim technical rept.,
W. Gibb Dyer, Jr. Jun 82, 64p Rept no. TR-ONR-7
Contract N00014-80-C-0905

With increasing frequency the term 'organizational culture' is being used as an explanatory concept in organizational analysis. This paper examines the concept of organizational culture and suggests that current formulations of this concept are inadequate because they tend to neglect the pattern of tacit assumptions that is at the core of any culture. A framework for deciphering the patterning of cultural assumptions is presented and this framework is used to describe the culture of one organization and delineate the boundaries of that culture.

AD-A117 931/6 PC **A04**/MF **A01**
Defense Language Inst., Lackland AFB, TX. English Language Center.
Summary of Interviews Related to Cultural Adaptation of US Army Soldiers whose Native Language is not English. Part I. Basic Training Interviews. Part II. Unit Interviews.
Final rept.,
Tom Molloy. Jul 82, 67p

This report contains a summary of interviews conducted related to cultural adaption of US Army soldiers. Interviews were conducted by curriculum development specialists at various BT and AIT centers and Army units in Conus, Korea, and Europe to identify any situational/cultural areas which would affect the development or conduct of English language training programs for non-native English speakers. (Author)

PB82-191958 PC **A10**/MF **A01**
National Center for Health Statistics, Hyattsville, MD. Div. of Vital Statistics.
Vital Statistics Mortality Multiple Cause Data, Detail, 1972. Documentation Package.
1972, 220p NCHS/DF-82/015A
For system on magnetic tape, see PB81-191966.

Vital Statistics data relating to mortality provide demographic, underlying and multiple cause-of-death data for deaths occurring during the calendar year. The data are based on information abstracted from all death certificates filed in vital statistics offices of each State and the District of Columbia. Death is defined as the permanent disappearance of any evidence of life at any time after live birth, therefore, data relating to fetal deaths are not included in the data. Demographic data include variables such as date of death, age, race, sex and geographic area. Underlying and multiple cause-of-death data have been coded to the causes shown in the Eighth Revision of the International Classification of Diseases, Adapted for Use in the United States. Death and infant mortality rates and/or denominators required to derive such rates are not on the tapes. A technical appendix giving information regarding the historical aspect and limitations of the data is included in the published volumes and the documentation for the data tapes. Specialized reports are published periodically in Vital and Health Statistics. Multiple cause-of-death data and the 'each cause' level of detail is included as Appendix I of the multiple cause-of-death documentation.

PB82-191966 Mag Tape $185.00
National Center for Health Statistics, Hyattsville, MD.
Vital Statistics Mortality Multiple Cause Data, Detail, 1972.
Data file,
Harry Rosenberg, and Joseph D. Farrell. 1972, mag tape NCHS/DF-82/015
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions. Price includes documentation.

Vital Statistics data relating to mortality provide demographic, underlying and multiple cause-of-death data for deaths occurring during the calendar year. The data are based on information abstracted from all death certificates filed in vital statistics offices of each State and the District of Columbia. Death is defined as the permanent disappearance of any evidence of life at any time after live birth, therefore, data relating to fetal deaths are not included in the data. Demographic data include variables such as date of death, age, race, sex and geographic area. Underlying cause-of-death data and multiple cause-of-death data have been coded to the causes shown in the Eighth Revision of the International Classification of Diseases, Adapted for Use in the United States. Death and infant mortality rates and/or denominators required to derive such rates are not on the tapes. A technical appendix giving information regarding the historical aspect and limitations of the data is included in the published volumes and the documentation for the data tapes. Multiple cause-of-death data at the 'each cause' level of detail is included as Appendix I of the multiple cause-of-death documentation.

PB82-243239 PC **A04**/MF **A01**
Veterans Administration Outpatient Clinic, Boston, MA. Geriatric Research, Educational and Clinical Center.
Toward Comprehensive Intervention Programs for Memory Problems among the Aged: Symposium Held in San Francisco, California on August 28, 1977 by American Psychological Association.
Technical rept.
28 Aug 77, 71p TR-77-01
Sponsored in part by American Psychological Association, Washington, DC.

Five papers are presented dealing with means of assessing and reducing the incidence of memory failure in older adults. From Clinical and Research Findings to Intervention Programs identifies directions for future research. Problems in Clinical Assessment of Memory delineates the inadequacies of currently available tests. Adaptational Factors in Memory Impairment of the Aged identifies clinical conditions and environmental factors which contribute to memory impairment. Remembering the Person: Relations of Individual Difference Variables to Memory describes research findings involving the relationships among measures of personality, performance, and endocrine function. Toward Appling Cognitive Skill Training to Memory Problems emphasizes skill training in organization and encoding, processes known to be impaired in the elderly. References are included after each paper.

PB82-250069 PC **A05**/MF **A01**
New Haven Fire Dept., CT.
City of New Haven - Arson Warning and Prevention Strategy; A Model Program for Arson Early Warning.
Final rept.
Mar 80, 87p
Contract FA-79-021
Sponsored in part by Factory Mutual System. Aetna Life and Casualty.

Arson is not an isolated crime nor is it exclusively a fire problem. Rather, arson is a complex, multi-faceted phenomena closely tied to prevailing socio-economic conditions, population shifts and patterns of housing deterioration and abandonment. The City of New Haven received a $10,000 award in August of 1978 from the Factory Mutual Engineering System to support the development of an innovative arson predictability model. It had previously been assumed that no recognizable difference existed between buildings which sustain fires and those which do not. However, the Fire Department felt it was possible to identify buildings which were potential arson targets by monitoring these signals. Moreover, if the appropriate preventive measures could be undertaken by City officials, law enforcement agencies, insurance companies and financial institutions, arson fires could be prevented.

PB82-251422 PC **A11**/MF **A01**
PADCO, Inc., Washington, DC.
Transition Housing for Victims of Disasters. Volume I: Disaster Assistance Manual.
Apr 81, 235p AID-PN-AAJ-399
Contract AID/OTR-C-1829

Following a disaster, A.I.D. often provides housing both to meet victims' immediate shelter needs and to create a base from which to reconstruct permanent housing. This manual for A.I.D. and host country disaster assistance and housing officials focuses on expeditious planning and implementation of conventional, contractor-built, low-and middle-income, transitional housing. Emphasis is placed on A.I.D.'s potential contribution and lessons learned from past experience in the following areas: (1) disaster assessment; (2) operational responsibility; (3) project beneficiaries; (4) project timing; (5) environmental considerations; (6) land ownership and financing; (7) site selection, location, layout, and access; (8) phased occupancy and implementation of infrastructure; (9) safe housing program components; (10) cyclone-, flood-, and earthquake-resistant design; and (11) project management and evaluation.

PB82-253428 PC **A23**/MF **A01**
Office of Technology Assessment, Washington, DC.
World Population and Fertility Planning Technologies: The Next 20 Years. Volume II: Working Papers.
Jun 82, 542p
See also PB82-253436 through PB82-253477 and PB82-200338.

This volume contains working papers written for OTA in preparation of the report World Population and Fertility Planning Technologies: The Next 20 Years. The contents include: (1) Prospects for new or improved birth control technologies by the year 2000 A.D.; (2) Factors influencing the demand for children and their relationship to contraceptive use; (3) Factors that determine the Appropriateness of new technologies to consumer needs; (4) Future prospects for the development of birth planning technology: What the experts think; (5) The impacts of population growth on less developed countries.

PB82-253436
(Order as PB82-253428, PC **A23**/MF **A01**)
Texas Univ. Health Science Center at San Antonio.
Prospects for New or Improved Birth Control Technologies by the Year 2000 AD,
Michael J. K. Harper. Jun 82, 119p
Included in World Population and Fertility Planning Technologies: The Next 20 Years. Volume II: Working Papers, pi, ii, 1-115 Jun 82.

No abstract available.

PB82-253444
(Order as PB82-253428, PC **A23**/MF **A01**)
Population Council, New York.
Factors Influencing the Demand for Children and Their Relationship to Contraceptive Use,
Michael T. Mertaugh. Sep 80, 41p
Included in World Population and Fertility Planning Technologies: The Next 20 Years. Volume II: Working Papers, p116-156 Jun 82.

No abstract available.

PB82-253451
(Order as PB82-253428, PC **A23**/MF **A01**)
Population Council, New York.
Factors that Determine the Appropriateness of New Technologies to Consumer Needs,
Paula E. Hollerbach. Jul 80, 31p
Included in World Population and Fertility Planning Technologies: The Next 20 Years. Volume II: Working Papers, p157-187 Jun 82.

No abstract available.

PB82-253469
Order as PB82-253428, PC **A23**/MF**A01**)
Hunter Coll., New York.
Future Prospects for the Development of Birth Planning Technology: What the Experts Think,
Pamela Cain. Jun 80, 40p
Included in World Population and Fertility Planning Technologies: The Next 20 Years. Volume II: Working Papers, p188-227 Jun 82.

No abstract available.

PB82-253477
(Order as PB82-253428, PC **A23**/MF **A01**)
Futures Group, Inc., Glastonbury, CT.
The Impacts of Population Growth on Less Developed Countries,
John G. Stover, Jonathan T. Bye, Karen B. Allen, Philander P. Claxton, Jr., and Thomas J. Goliber.
Aug 80, 120p
Included in World Population and Fertility Planning Technologies: The Next 20 Years. Volume II: Working Papers, p228-347 Jun 82.

No abstract available.

PB82-254160 PC **A06**/MF **A01**
Center for Research on the Acts of Man, Philadelphia, PA.
The Civic Community: A Matriarchal Force.
Final rept.,
Samuel Z. Klausner. Feb 82, 116p DLETA-51-42-79-02-1
Contract DL-51-42-79-02

Theories of the family which inform current poverty, welfare and manpower policies tend to view the family as a set of exchange relationships with the role of the breadwinner as pivotal. This report, based on an analysis of a sample of men and their mates in Camden County, N.J., demonstrates that jural authority in the family is developed around a sense of moral obligation among the members of the family. Economic interests, in particular, and exchange relationships, in general, are not central to the solidarity of the family. The difference between a relatively matriarchal and a relatively patriarchal family is not simply a matter of the sex of the incumbent to the juridical and sanctioning role. Rather, these terms distinguish two social organizational forms. The patriarchal family is more isolated and self-contained. The matriarchal family maintains many ties, economic and political, with the civic community. The norms of the civic community support matriarchy in the family.

PB82-254210 PC **A05**/MF **A01**
Center for Research on the Acts of Man, Philadelphia, PA.
The Social Networks and Socioeconomic Status of Lower Income Men and Women.
Final rept.,
Albert G. Crawford. Jan 82, 78p DLETA-51-42-79-02-2
Grant DL-51-42-79-02

This report describes the influence of the kinship and friendship networks of lower income men and women on their socioeconomic status. The survey respondents included 723 men, 414 of their mates, and 327 female household heads living in Camden County, New Jersey, in 1973. The networks of the men and women do influence their status attainment. However, insofar as networks reinforce prior status differences between individuals, networks have little role in promoting individual social mobility. Thus, while networks promote mobility in some cases, policy makers should not expect networks to play a major role in upgrading the status of the poor.

6.

BIOLOGICAL AND MEDICAL SCIENCES

6A. Biochemistry

AD-A117 649/4 Not available NTIS
Duke Univ. Medical Center, Durham, NC. Dept. of Biochemistry.
Superoxide Radical Inhibits Catalase,
Yasuhisa Kono, and Irwin Fridovich. 28 Dec 81, 5p
ARO-15319.30-LS
Grant DAAG29-78-G-0088
Availability: Pub. in Jnl. of Biological Chemistry, v257 n10 p5751-5754, 25 May 82 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A117 832/6 PC **A02**/MF **A01**
Naval Medical Research Unit No. 2, Manila (Philippines).
Acid Protease in Adult Schistosoma Japonicum (Formosan Strain).
Technical rept.,
Elsa Pan Yang, and Ling Chow. 1981, 12p Rept no. NAMRU-2-TR-906
Pub. in the Chinese Microbiology and Immunology v14 n3 p15-18 1981. Text in Chineseand English.

No abstract available.

DE82011872 PC **A03**/MF **A01**
Franklin McLean Memorial Research Inst., Chicago, IL.
Lymphocyte Transformation as a Model System. Final Report, January 1, 1980-December 31, 1980.
S. Yachnin. Jan 82, 36p DOE/EV/10357-1
Contract AC02-80EV10357
Portions of this report are illegible.

The following investigations were conducted during the period of this grant: measurement of the insertion of oxygenated sterol compounds (OSC) into human red cells and lymphocyte membranes; the relationship of such insertion to functional and morphological alterations such as echinocyte formation and decreased osmotic fragility in red cells, and inhibition of E-rosette formation and lymphocyte capping in human lymphocytes; a study of the binding of OSC by various lipoprotein fractions of human serum; a study of the effects of human serum lipoprotein on the insertion of OSC into red cell and lymphocyte membranes; a study of the effects of OSC and ML-236B (Compactin) on human lymphocyte proliferation in vitro; a study of the effects of OSC and ML-236B on the synthesis of sterol and nonsterol derived products of mevalonic acid in human lymphocytes; a study of the initiation of cell growth in human lymphocytes by mevalonic acid; and a study of the inhibition of the formation of CFU-C in vitro from human bone marrow mononuclear cells by OSC and ML-236.

PB82-249277 PC **A02**/MF **A01**
Health Effects Research Lab., Research Triangle Park, NC.
Does Iron or Heme Control Rat Hepatic Delta-Aminolevulinic Acid Synthetase Activity.
Journal article,
Kirk T. Kitchin, and Jackie Farmer. 5 Nov 81, 9p
EPA-600/J-81-331
Pub. in Biochemical and Biophysical Research Communications, v103 n4 p1172-1178, 31 Dec 81.

Disodium ethylenediamine tetraacetic acid and/or allylisopropylacetamide administration to rat pups did not evoke a premature induction of hepatic d-aminolevulinic acid synthetase. Administration of iron to adult rats did not alter d-aminolevulinic acid synthetase activity and had little inductive effect on home oxygenase activity. Both heme and cobalt/dextran rapidly induced microsomal heme oxygenase by 3-8 fold. Induction of heme oxygenase by heme could be totally blocked by concurrent administration of cyclo-heximide. These results argue against the hypothesis that iron is the physiological mediator of d-aminolevulinic acid synthetase activity.

PB82-250614 PC **A02**/MF **A01**
California Primate Research Center, Davis.
Composition of Glycoproteins Secreted by Tracheal Explants from Various Animal Species.
Journal article,
Tokio Kaizu, Sheila A. Lyons, Carroll E. Cross, Mark D. Jennings, and Jerold A. Last. c1979, 8p EPA-600/J-82-207
Grant EPA-R-805355
Pub. in Comparative Biochemistry and Physiology, v62B p195-200 1979.

The acidic and neutral glycoproteins secreted by cultured tracheal explants from pigs, sheep, rats, mice, monkeys, guinea pigs, dogs, and chickens were purified and fractionated by column chromatography on DEAE-cellulose and by electrophoresis on cellulose acetate. The ratios of acidic to neutral mucus glycoproteins were compared for the above animals with that of mucus glycoproteins secreted by cultured human bronchi. The observed ratios of acidic to neutral glycoproteins ranged from 4.0 (mouse) to 7.2 (chicken and pig) from cultured tracheae; secreted human bronchial mucus had a ratio of 2.7. The ratio of acidic to neutral glycoproteins secreted by tracheal explants varied with duration of incubation of the trachea in culture.

PB82-250622 PC **A02**/MF **A01**
California Primate Research Center, Davis.
Mucus Glycoprotein Secretion by Tracheal Explants: Effects of Pollutants.
Journal article,
Jerold A. Last, and Tokio Kaizu. Jun 82, 9p EPA-600/J-82-208
Grant EPA-R-805355
Pub. in Environmental Health Perspectives, v35 p131-138 1980.

Tracheal slices incubated with radioactive precursors in tissue culture medium. The authors have used anin vitro approach, a combined method utilizing exposure to pneumotoxins in vivo coupled with quantitation of mucus secretion rates in vitro, to study the effects of inhaled pollutants on mucus biosynthesis by rat airways. In addition, the authors have purified the mucus glycoproteins secreted by rat tracheal explants in order to determine putative structural changes that might be the basis for the observed augmented secretion rates after exposure of rats to H2SO4 aerosols in combination with high ambient levels of ozone.

PB82-874132 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Cereal Manufacture. 1972-August, 1982 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for 1972-Aug 82.
Aug 82, 107p
Prepared in cooperation with the International Food Information Service, Frankfurt am Main (Germany, F.R.).

This bibliography contains citations concerning raw materials, processes, and equipment for the production of cereals and cereal based foods. Extrusion equipment and processes, including cold forming, gelatinization under pressure, and high pressure cooking and expansion are discussed. Methods to enhance storage and stability are also considered. (Contains 121 citations fully indexed and including a title list.)

6C. Biology

AD-A117 646/0 PC **A02**/MF **A01**
Naval Medical Research Unit No. 2, Manila (Philippines).
Filarid Parasites of South Kalimantan (Borneo) Indonesia. Wuchereria kalimantani sp. N. (Nematoda: Filarioidea) from the Silvered Leaf Monkey, Presbytis cristatus Eschscholtz 1921.
Technical rept.,
James R. Palmieri, 1 Jun 79, 11p Rept no. NAMRU-2-TR-892
Pub. in Jnl. of Parasitology, v66 n4 p645-651 1980.

No abstract available.

AD-A117 707/0 PC **A02**/MF **A01**
Naval Medical Research Unit No. 2, Manila (Philippines).
Survey of Small Mammal Ectoparasites in West Sumatra, Indonesia.
Technical rept.,
T. R. Hadi, Sukaeri Sarbini, and D. T. Dennis. 1981, 6p Rept no. NAMRU-2-TR-902
Pub. in Southeast Asian Jnl. of Tropical Medicine and Public Health, v12 n2 p275-277 1981.

No abstract available.

PB82-201047 PC**$10.50**/MF **A01**
Centers for Disease Control, Atlanta, GA. Lab. Improvement Program Office.
Basic Laboratory Techniques in Cell Culture,
Billie Ruth Bird, and Francis T. Forrester. Jan 81, 189p HHS/CDC/LIPO-81/001

This is a reference and instructional manual for the Centers for Disease Control (CDC) Course Number 8270-C, 'Basic Laboratory Techniques in Cell Culture.' It covers pertinent cell biology, cell culture terminology and definitions, the principles and methodology of basic animal cell culture, laboratory procedures, and guidelines for operating a cell culture laboratory. Reagent preparation and a bibliography are also included. Material is presented through written text, photographs, illustrations, and student exercises.

PB82-250549 PC **A05**/MF **A01**
Agricultural Univ., Wageningen (Netherlands).
Comparative Aspects of Taste Receptors and Hostplant Selection in Larvae of Various Yponomeuta Species (Lepidoptera).
Studies in Yponomeuta no. 1,
W. van Drongelen. 8 Oct 80, 80p

Contents: Contact chemoreception of host plant specific chemicals in larvae of various Yponomeuta species (Lepidoptera); Gustatory sensitivity and taxonomic relationships in larvae of some Yponomeuta species (Lepidoptera); Behavioral responses of two small ermine moth species (Lepidoptera: Yponomeutidae) to plant constituents; Inheritance of gustatory sensitivity in F1 progeny of crosses between Yponomeuta cagnagellus and Y. malinellus (Lepidoptera); Computerized analysis of multi-unit spike activity; Pores in the insect contact-chemosensory hair; a theoretical study; Chemical senses and flavor; Convergence in the olfactory system: quantitative aspects of odor sensitivity.

PB82-250556 PC **A06**/MF **A01**
Leiden Rijksuniversiteit (Netherlands).
Allozyme Polymorphism and the Speciation Process in Small Ermine Moths (Lepidoptera, Yponomeutidae).
Studies in Yponomeuta no. 2,
S. B. J. Menken. 3 Dec 80, 117p

Contents: Biochemical genetics and systematics of small ermine moths (Lepidoptera, Yponomeutidae); Allozymes and the population structure of Yponomeuta Cagnagellus (Lepidoptera); Inheritance of allozymes in Yponomeuta (Lepidoptera); Inheritance of allozymes in Yponomeuta (Lepidoptera); Host races and sympatric speciation in small ermine moths (Lepidoptera, Yponomeutidae).

PB82-250564 PC **A06**/MF **A01**
Groningen Rijksuniversiteit (Netherlands).
Olfactory Receptors in Small Ermine Moths (Lepidoptera, Yponomeutidae) Electrophysiology and Morphology.
Studies in Yponomeuta no. 3,
J. N. C. van der Pers. 12 Dec 80, 118p

Contents: Distribution of sense organs on male antennae of small ermine moths, Yponomeuta spp. (Lepidoptera: Yponomeutidae); Single cell responses from olfactory receptors of small ermine moths to sex attractants; Comparison of single cell responses of antennal sensilla trichodea to sex attractants in the nine European small ermine moths (Yponomeuta spp.); Responses from olfactory receptors in females of three species of small ermine moths (Lepidoptera: Yponomeutidae) to plant odors; Comparison of electroantennogram response spectra to plant volatiles in seven species of Yponomeuta and in the tortricid Adoxophyes orana; Interactions between plant odors and pheromone reception in small ermine moths (Lepidoptera: Yponomeutidae).

PB82-250648 PC **A03**/MF **A01**
Tennessee Univ., Knoxville.
Chiroptera of the Great Smoky Mountains: Bibliography with Indexes by Species and Major Subject Areas.
Research/Resources Management rept.
Alan Rabinowitz. Jan 82, 33p R/RM/SER-56

Of the 40 species of bats known to occur within the United States, 15 occur within Tennessee and/or North Carolina and 10 species occur within the Great Smoky Mountains National Park. This bibliography attempts to document much of the literature concerning bat research and species occurrence in the park and surrounding southeastern states. The bibliography cites approximately 235 books, theses, journal articles,

and pieces of correspondence; these cover 117 years, from 1864 to 1981, and are primarily ecological in nature.

PB82-252586 PC **A05**/MF **A01**
National Park Service, Atlanta, GA. Southeast Regional Office.
Systematics and Identification of Southern Appalachian Phanerogams: An Indexed Bibliography.
Research/Resources Management rept.,
B. Gene Wofford, and Peter S. White. Oct 81, 77p R/RM-53
Prepared in cooperation with Tennessee Univ., Knoxville.

This bibliography was developed to provide researchers and naturalists with an up-to-date list of the literature on Southern Appalachian phanerogams. The subject matter includes the monographic, systematic, nomenclatural, and taxonomic literature of the phanerogams (flowering plants or seed plants) of the Southern Appalachian mountains. Emphasis was placed on literature that provided aids to identification. The report includes several categories of general works: floristic manuals, rare and endangered plant lists, woody plant identification guides, wildflower guides, aquatic plant manuals, and edible, medicinal, and poisonous plant manuals.

PB82-252594 PC **A05**/MF **A01**
National Park Service, Atlanta, GA. Southeast Regional Office.
Changes in Standing Crop of Brook Trout Concurrent with Removal of Exotic Trout Species, Great Smoky Mountains National Park.
Research/Resources Management rept.,
Stephen E. Moore, Bromfield L. Ridley, and Gary L. Larson. Jan 81, 98p R/RM-37
Prepared in cooperation with Tenessee Technological Univ., Cookeville. Dept. of Biology.

Exotic rainbow trout (Salmo gairdneri) and brown trout (Salmo trutta) were removed by electrofishing from sympatric populations containing native brook trout (Salvelinus fontinalis) in remote headwater stream study areas in Great Smoky Mountains National Park. Exotic trouts were removed each year and brook trout were marked and returned to the areas from which they were captured. As exotic species were removed from sympatric populations, brook trout populations responded markedly, showing increases in numbers and total weights as reflected by standing crops of each sympatric population. In 1978, the standing crop of only one sympatric population had increased to surpass the numerical value present at the beginning of this investigation in 1976.

PB82-252610 PC **A03**/MF **A01**
National Park Service, Atlanta, GA. Southeast Regional Office.
Reports on Rare, Threatened, and Endangered Vascular Plants: Discussion and Guidelines.
Research/Resources Management rept.,
Peter S. White. May 80, 50p R/RM-33

The Federal Endangered Species Act of 1973, state programs, and the efforts of private environmental organizations have resulted in the compilation of numerous reports on rare vascular plants. While all of these have a common goal--the reporting of rare taxa, distribution and status--they differ widely in format. There is no wide agreement on what to report or how to categorize it. This report discusses information appropriate for rare and endangered plant species reports, and proposes guidelines for the preparation of such. The guidelines presented were developed for use in Great Smoky Mountains National Park, Tennessee and North Carolina, and the examples used to illustrate these guidelines were taken from that region.

PB82-252628 PC **A03**/MF **A01**
National Park Service, Atlanta, GA. Southeast Regional Office.
Southern Appalachian Pteridophytes: An Indexed Bibliography, 1833-1980.
Research/Resources Management rept.,
A. Murray Evans, and Peter S. White. Feb 81, 44p R/RM-44
Prepared in cooperation with Tennessee Univ., Knoxville.

The purpose of this indexed bibliography is to provide researchers and naturalists with information on the published research that has been done on the pteridophytes (ferns and other spore-bearing vascular plants) of the Southern Appalachians. The report assembles pertinent literature on the distribution, ecology, identification, nomenclature, and evolution of Southern Appalachian pteridophytes.

PB82-255233 PC **A06**/MF **A01**
Council of Scientific and Industrial Research, New Delhi (India). Publications and Information Directorate.
Medicinal and Aromatic Plants Abstracts, Volume 4, Number 3, June 1982.
c1982, 113p
See also Volume 4, Number 2, PB82-224981, and Volume 3, Number 5, PB82-124199. Also pub. in ISSN-0250-4367.

Contents: Agronomy, Botany(General & systematic), Breeding & genetics, Diseases & pests, Physiology & biochemistry, Pharmacognosy, Clinical studies, Pharmacology & toxicology, Antimicrobial activity, Insecticidal & piscicidal activities, Phytochemistry, Chemotaxonomy, Ethnomedicine, and Analytical & processing techniques.

PB82-923003 PC**$6.00**/MF**$3.00**
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Cell Hybridization.
Oncology overview.
Aug 82, 93p NCI/ICRDB/OB-82/03

Oncology Overviews are a service of the International Cancer Research Data Bank (ICRDB) Program of the National Cancer Institute, intended to facilitate and promote the exchange of information between cancer scientists by keeping them aware of literature related to their research being published by other laboratories throughout the world. Each Oncology Overview represents a survey of the literature associated with a selected area of cancer research. It contains abstracts of articles which have been selected and organized by researchers associated with the field. Contents: Development of hybridization techniques; Use of cell hybridization in the analysis of malignancy; Gene mapping, gene expression, and the expression of differentiated characteristics in hybrid cells; Use of cell hybridization in the study of virus-host cell interactions.

6E. Clinical Medicine

AD-A117 367/3 PC **A02**/MF **A01**
Walter Reed Army Inst. of Research, Washington, DC.
Genital Antibody Response to a Parenteral Gonococcal Pilus Vaccine,
Daniel McChesney, Edmund C. Tramont, John W. Boslego, Jennie Ciak, and Jerald Sadoff. 17 Sep 81, 8p
Pub. in Infection and Immunity, v36 n3 p1006-1012 Jun 82.

No abstract available.

AD-A117 368/1 PC **A02**/MF **A01**
Walter Reed Army Inst. of Research, Washington, DC.
Macrophages in Resistance to Rickettsial Infection: Strains of Mice Susceptible to the Lethal Effects of Rickettsia akari Show Defective Macrophage Rickettsicidal Activity in vitro,
Carol A. Nacy, and Monte S. Meltzer. 4 Dec 81, 7p
Pub. in Infection and Immunity, v36 n3 p1096-1101 Jun 82.

No abstract available.

AD-A117 375/6 PC **A02**/MF **A01**
Army Medical Research Unit, Kuala Lumpur (Malaysia).
Serological Analysis of Rickettsia tsutsugamushi Isolates from North Queensland,
A. Shirai, R. W. Campbell, E. Gan, T. C. Chan, and D. L. Huxsoll. 14 Dec 81, 4p
Grant DAMD17-80-G-9467
Pub. in the Australian Jnl. of Experimental Biology and Medical Science, v60 pt2 p203-205 1982.

No abstract available.

AD-A117 405/1 PC **A02**/MF **A01**
Institute for Medical Research, Kuala Lumpur (Malaysia).
Transmission of Scrub Typhus to Human Volunteers by Laboratory-Reared Chiggers,
Akira Shirai, J. Peter Saunders, Alexander L. Dohany, David L. Huxsoll, and Michael G. Groves. 12 Nov 81, 11p
Pub. in Japanese Jnl. of Medical Science and Biology, v35 n1 p9-16 Feb 82.

No abstract available.

AD-A117 406/9 PC **A02**/MF **A01**
Walter Reed Army Inst. of Research, Washington, DC.
Expression of Immunoglobulin Heavy Chain Isotypes by Peyer's Patch Lymphocytes Stimulated with Mitogens in Culture. (Lymphocytes of Peyer's Patch),
Jeenan Tseng. 23 Nov 81, 9p
Pub. in the Jnl. of Immunology, v128 n6 p2719-2725 Jun 82.

No abstract available.

AD-A117 411/9 PC **A21**/MF **A01**
Walter Reed Army Inst. of Research, Washington, DC.
Walter Reed Army Institute of Research Annual Progress Report, Fiscal Year 1981.
Rept. for 1 Oct 80-30 Sep 81,
Philip K. Russell. 1 Oct 81, 495p

Contents: In-House Laboratory Independent Research; Research on Military Disease, Injury and Health Hazards; Drug and Vaccine Development; Risk Assessment of Military Disease Hazards; Prevention of Military Disease Hazards; Methods and Techniques for Combat Casualty Management; Medical Systems of Nonconventional Environment; Health Hazards of Military Materiel; and Factors Limiting Soldiers Effectiveness.

AD-A117 464/8 PC **A02**/MF **A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
The Healing Process with Vertebral Fracture, with Special Consideration of the Question of Traumatic Spondylosis Deformans. Part I. Animal Experiments,
Alfons Lob. 7 Jun 82, 23p Rept no. FTD-ID(RS)T-0506-82
Edited trans. of Deutsche Zeitschrift fuer Chirurgie (German D. R.) v248 p452-466 1937.

No abstract available.

AD-A117 479/6 PC **A02**/MF **A01**
Walter Reed Army Inst. of Research, Washington, DC.
Infection Enhancement of Dengue Type 2 Virus in the U-937 Human Monocyte Cell Line by Antibodies to Flavivirus Cross-Reactive Determinants,
Walter E. Brandt, Jack M. McCown, Mary K. Gentry, and Philip K. Russell. 16 Nov 81, 7p
Pub. in Infection and Immunity, v35 n3 p1036-1041 Jun 82.

No abstract available.

AD-A117 481/2 PC **A02**/MF **A01**
Walter Reed Army Inst. of Research, Washington, DC.
Trypanosoma brucei rhodesiense (Trypanosomatidae): Factors Influencing Infection Rates of a Recent Human Isolate in the Tsetse Flies, Glossina morsitans (Diptera: Glossinidae),
J. B. Gingrich, R. A. Ward, L. M. Macken, and M. J. Schoenbechler. 1982, 8p
Pub. in Jnl. of Medical Entomology, v19 n3 p268-274, 28 May 82.

No abstract available.

AD-A117 490/3 PC **A05**/MF **A01**
Geomet Technologies, Inc., Rockville, MD.
Emergency Medical Treatment Needs: Chronic and Acute Exposure to Hazardous Materials.
Final rept.,
David A. Hammond, Horace S. Anderson, and Michael D. Koontz. Jun 82, 94p Rept no. GTI-EHF-1004
Contract EMW-C-0750

This report identifies gaps in the ability of the medical community to recognize and treat problems resulting from exposure to hazardous materials. A summary of available guidance for medical management following chemical exposures is presented. The guidance focuses on prehospital and in-hospital care. The feasibility

or utility is assessed for subclassifying chemicals by toxic effects or by chemical properties. The assessment relates to medical management. One study recommendation is for establishment of a resource and referral center to assimilate/review chemical toxicity data and medical management protocols. The protocols, oriented toward recognizing signs and symptoms, should generally be chemical-specific. Other recommendations concern improved training programs, community needs assessments, and incident feedback. (Author)

AD-A117 624/7 PC **A02**/MF **A01**
Naval Medical Research Unit No. 2, Manila (Philippines).
Humoral and Cellular Responses in Scrub Typhus Patients Reflecting Primary Infection and Reinfection with Rickettsia tsutsugamushi.
Technical rept.,
A. L. Bourgeois, J. G. Olson, R. C. Y. Fang, J. Huang, and C. L. Wang. 8 Dec 81, 13p Rept no. NAMRU-2-TR-909

No abstract available.

AD-A117 639/5 PC **A02**/MF **A01**
Naval Medical Research Unit No. 2, Manila (Philippines).
Epidemic Dengue 3 in Central Java, Associated with Low Viremia in Man.
Technical rept.,
D. J. Gubler, W. Suharyono, I. Lubis, S. Eram, and S. Gunarso. 28 Feb 81, 10p Rept no. NAMRU-2-TR-893
Pub. in American Jnl. of Tropical Medicine and Hygiene, v30 n5 p1094-1099 1981.

No abstract available.

AD-A117 645/2 PC **A02**/MF **A01**
Naval Medical Research Unit No. 2, Manila (Philippines).
The Long Term Effects of Repeated Diethylcarbamazine Administration with Special Reference to Microfilaraemia and Elephantiasis.
Technical rept.,
R. Partono, 1981, 13p Rept no. NAMRU-2-TR-896
Pub. in Acta Tropica, v38 p217-225 1981.

No abstract available.

AD-A117 655/1 PC **A02**/MF **A01**
Naval Medical Research Unit No. 2, Manila (Philippines).
Immune Responses in Human Infections with Brugia Malayi Specific Cellular Unresponsiveness to Filarial Antigens.
Technical rept.,
Willy F. Piessens, Patrick B. McGreevy, Patricia W. Piessens, Mary McGreevy, and Iskak Koiman. 9 Mar 79, 13p Rept no. NAMRU-2-TR-889
Pub. in Jnl. of Clinical Investigation, v65 p172-179 Jan 80.

No abstract available.

AD-A117 656/9 PC **A02**/MF **A01**
Naval Medical Research Unit No. 2, Manila (Philippines).
Comparison of the Widal Test with Salmonella typhi Isolation from Typhoid Fever Patients in Jakarta, Indonesia.
Technical rept.,
Robert C. Rockhill, Asril Moechtar, and Arini Soetomo. 1981, 8p Rept no. NAMRU-2-TR-891
Pub. in Medika, n6(7) p351-354 Jun 81.

No abstract available.

AD-A117 676/7 PC **A02**/MF **A01**
Naval Medical Research Unit No. 2, Manila (Philippines).
Malaria Blood Cultures: A Rapid Fixation Method to Prevent Sloughing of the Thick Film,
Technical rept.
L. L. Smrkovski, and C. S. Rodriguez. 31 Mar 81, 5p Rept no. NAMRU-2-TR-897
Pub. in Transactions of the Royal Society of Tropical Medicine and Hygiene, v75 n6 p901-902 1981.

No abstract available.

AD-A117 677/5 PC **A02**/MF **A01**
Naval Medical Research Unit No. 2, Manila (Philippines).
Fansidar Resistant Falciparum Malaria in Indonesia.
Technical rept.,
Larry W. Rumans, David T. Dennis, and Soeroto Atmosoedjono. 1979, 5p Rept no. NAMRU-2-TR-894
Pub. in the Lancet p581 15 Sep 79.

No abstract available.

AD-A117 678/3 PC **A02**/MF **A01**
Naval Medical Research Unit No. 2, Manila (Philippines).
Seroepidemiology of Scrub Typhus and Murine Typhus in the Philippines.
Technical rept.,
John H. Cross, and Virginia Basaca-Sevilla. 1981, 14p Rept no. NAMRU-2-TR-898
Pub. in Jnl. of Microbiology and Infectious Diseases, v10 n1 p25-34 1981. Presented at the Annual Convention of the PSMID (3rd), Manila, Nov 80.

No abstract available.

AD-A117 704/7 PC **A02**/MF **A01**
Naval Medical Research Unit No. 2, Manila (Philippines).
Prevention of Scrub Typhus: Prophylactic Administration of Doxycycline in a Randomized Double Blind Trial.
Technical rept.,
James G. Olson, A. Louis Bourgeois, Richard C. Y. Fang, James C. Coolbaugh, and David T. Dennis. 20 Oct 79, 13p Rept no. NAMRU-2-TR-908
Pub. in American Jnl. of Tropical Medicine and Hygiene, v29 n5 p989-997 1980.

No abstract available.

AD-A117 705/4 PC **A02**/MF **A01**
Naval Medical Research Unit No. 2, Manila (Philippines).
Intestinal Parasitic Infections in Southeast Asia.
Technical rept.,
John H. Cross, and Virginia Basaca-Sevilla. 1981, 17p Rept no. NAMRU-2-TR-905
Pub. in Southeast Asian Jnl. of Tropical Medicine and Public Health, v12 n2 p262-274 1981.

No abstract available.

AD-A117 706/2 PC **A02**/MF **A01**
Naval Medical Research Unit No. 2, Manila (Philippines).
Comparison of the Kato Thick Smear Technique Using Fresh and Frozen Stool Specimens,
W. P. Carney, and J. H. Cross. 1981, 5p Rept no. NAMRU-2-TR-901
Pub. in Southeast Asian Jnl. of Tropical Medicine and Public Health, v12 n2 p278-279 1981.

No abstract available.

AD-A117 709/6 PC **A02**/MF **A01**
Massachusetts Univ. Medical School, Worcester. Dept. of Medicine.
The Etiology and Pathogenesis of Viral Gastroenteritis.
Annual progress rept. no. 1, 1 Aug 81-31 Jul 82,
Neil R. Blacklow. 31 Jul 82, 19p
Contract N00014-81-C-0673

The purpose of this project is to identify, cultivate, and characterize etiologic agents of viral gastroenteritis of man and to study the pathogenesis of infection in order to provide information necessary to attain the ultimate goals of prevention and cure of this common syndrome. Progress achieved during the current year can be summarized as follows. Monoclonal antibody techniques have been utilized successfully to prepare purified antibodies against Norwalk virus with 5 positive clones now prepared. These monoclonal antibodies are being tested as probes to detect a potential group specific antigen common to the noncytopathic Norwalk-like virus group and to recognize these viruses in nature. In addition, studies are underway to try to cultivate Norwalk virus, using methods that proved successful for the in vitro cultivation of hepatitis A virus and rotavirus.

AD-A117 773/2 PC **A02**/MF **A01**
Army Medical Research Unit, Nairobi (Kenya).
Cordylobia Anthropophaga (Diptera: Calliphoridae) Myiasis in an Infant and Dog and a Technique for Larval Rearing.
Scientific article Jan-Apr 80,
Lyman W. Roberts, William L. Boyce, and William H. Lylery, Jr. 1982, 3p
Grant DAMD17-80-G-9475
Pub. in Jnl. of Medical Entomology, v19 n3 p350-351, 28 May 82.

No abstract available.

AD-A117 795/5 PC **A03**/MF **A01**
Naval Health Research Center, San Diego, CA.
Immunodiagnostic Techniques for Bacterial Infections.
Final rept.,
Earl A. Edwards, Michael W. Rytel, and Richard L. Hilderbrand. 1981, 38p Rept no. NAVHLTHRSCHC-77-39
Pub. in Diagnostic Procedures for Bacterial, Mycotic, and Parasitic Infections, p767-790 1981.

No abstract available.

AD-A117 796/3 PC **A02**/MF **A01**
Naval Health Research Center, San Diego, CA.
Psychiatrists' Transition from Training to Career: Stress and Mastery.
Final rept.,
John G. Looney, Richard K. Harding, Mark J. Blotcky, and F. David Barnhart. 13 Apr 79, 7p Rept no. NAVHLTHRSCHC-79-9
Pub. in American Jnl. of Psychiatry, v137 n1 p32-36 Jan 80. Presented at the 132nd Annual Meeting of the American Psychiatric Association, 12-18 May 79, Chicago, IL.

No abstract available.

AD-A117 827/6 PC **A02**/MF **A01**
Walter Reed Army Inst. of Research, Washington, DC.
Immunological Cross-Reactivity in the Absence of DNA Homology between Pseudomonas Toxin A and Diphtheria Toxin,
Jerald C. Sadoff, Gregory A. Buck, Barbara H. Iglewski, Michael J. Bjorn, and Neal B. Groman. 28 Sep 81, 6p
Pub. in Infection and Immunity, v37 n1 p250-254 Jul 82.

No abstract available.

AD-A117 833/4 PC **A02**/MF **A01**
Naval Medical Research Unit No. 2, Manila (Philippines).
Population Indices of Chiggers (Leptotrombidium Deliense) and Incidence of Scrub Typhus in Chinese Military Personnel, Pesadores Islands of Taiwan, 1976-77.
J. G. Olson, A. L. Bourgeois, and R. C. Y. Fang. 5 May 81, 7p Rept no. NAMRU-2-TR-907
Pub. in the Trans. Royal Society of Tropical Medical Hygiene, v7 n1 p85-88, 1981.

No abstract available.

AD-A117 870/6 PC **A06**/MF **A01**
Columbia Univ., New York. Centers for Community Health.
Research and Development of Psychological Considerations in Dentistry.
Final rept. Oct 79-Mar 82,
Stanley Budner, Mary O'Neill Berry, and Nancy S. Budner. May 82, 103p
Contract DAMD17-79-C-9140

Despite attempts by the Army to ensure that all personnel receive regular dental care, substantial manpower loss occurs in field situations because of preventable dental emergencies. The purpose of this study is to identify factors which correlate with both starting and completing dental treatment. Dental records at two posts (Fort Bragg and Fort Stewart) were screened to identify three groups of personnel: those who were diagnosed as needing treatment by the Army Dental Service but who did not start such treatment; those who broke off treatment, and those who completed it. Data from those screened were obtained by means of self-administered questionnaires; a total of 243 usable questionnaires were collected at Fort Bragg and 207 at Fort Stewart. In the data analysis, two separate measures of treatment status were used: one based on dental record data, the other on self-report data. Psychological factors which show a positive association with starting and/or completing treatment include: perceptions of Army dentists as technically competent and as concerned with patients; per-

ceptions of dentists in general as concerned with patients; and belief that dental care is important in the Army. Both anxiety with respect to dental care and perceptions of dental care as painful correlate negatively with receipt of care.

AD-A117 879/7 PC **A10**/MF **A01**
Dynatech R/D Co., Cambridge, MA.
Assessment of Wound Therapy Systems.
Final rept.,
Stanton de Riel, Joseph D. Gresser, Constance E. West, and Donald L. Wise. 7 May 82, 221p Rept no. DYNATECH-2165
Contract N00014-81-C-0468

The current state of burn-wound therapy and treatment was investigated. Literature sources of the period 1977 - August, 1981, were surveyed, yielding 283 references discussed in the review of burn wound treatment and healing. Interviews were held with eight researchers currently active in the development of materials for burn wound coverings. Their activities and opinions were summarized. The adherence of four wound coverings to areas of skin excision on rats was measured. Quantitative measures of adherence were obtained and differences in fluid accumulation under the coverings were observed. A poly-epsilon-caprolactone covering developed for the Navy was tested in two pig experiments and evaluated by means of bacteriology, histopathology, and pervaporation rates.

AD-A117 924/1 PC **A03**/MF **A01**
Naval Health Research Center, San Diego, CA.
Forecasting Illness Aboard Navy Ships: Methodological Issues.
Final rept.,
William M. Pugh. 11 Jan 80, 32p Rept no. NAVHLTHRSCHC-79-54

Analyses of data from destroyer-type ships were used to develop a model called the Morbidity Forecast Model (MFM) which was designed to predict specific and total illnesses aboard Navy ships. In the present study, the MFM was applied to a sample of amphibious assault ships to evaluate the instruments, procedures, and validity of illness predictions of the model. Results indicated that the individual predictor instruments were reliable and that five out of six correlated significantly with total illness. However, because of problems encountered when employing a novel method for constructing the prediction equations, the MFM initially performed poorly when applied to prediction of illness on amphibious ships. But, when the equations were reconstituted, the predictions improved considerably. Also, when ship differences were removed to compensate for the lack of power due to the small sample size, the MFM predicted a significant amount of variance in four or five illness categories. Thus, it was concluded that the MFM can be used to predict illness rates from environmental conditions aboard ship. However, it was suggested that, in the future, predictions could be improved by better adjusting for ship-type differences and by taking into account the operational status of each ship throughout a deployment. (Author)

AD-A117 941/5 PC **A02**/MF **A01**
Walter Reed Army Inst. of Research, Washington, DC.
Application of the Nursing Process to Improve the Quality of Nursing Service Provided to a Military Community in Germany.
Mary K. McKenna, and Priscilla W. Hales. 1982, 4p Pub. in Military Medicine, v147 n7 p558-560 Jul 82.

No abstract available.

DE82007649 MF **A01**
Massachusetts Inst. of Tech., Cambridge.
Osmium-191 Implies Iridium-191M Radionuclide Generator: Development and Clinical Application. Progress Report, March 1, 1981-February 28, 1982.
S. Treves, and C. Cheng. 1981, 20p DOE/EV/04115-T1
Contract AS02-76EV04115
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

A prototype osmium-191 (T 1/2 = 16 days) implies iridium-191m (T 1/2 = 4.9 seconds) generator designed for first pass radionuclide angiography was developed in our laboratory (Os-191 implies Ir-191m). Our generator had 14 to 20% Ir-191m yield and a 1 to 3 x 10 exp -3 % Os-191 breakthrough. Iridium-191m decays with emission of a 65 and a 129 keV photon in 50% and 25% abundance respectively. This radionuclide is advantageous for angiography since it provides higher photon flux and results in much lower radiation dose to the patient than Tc-99m. One objective of this research is to improve the Os-191 implies Ir-191m generator for first pass radionuclide angiography at an increase in the Ir-191m yield and a decrease in the Os-191 breakthrough. In addition, we would like to develop an Os-191 implies Ir-191m generator for continuous infusion which will be used for ECG gated blood pool ventriculography, venography, and arteriography. Another approach will be to develop a carrier free Os-191 implies Ir-191m generator in combination with organic or inorganic exchangers. Iridium-191m from our current generator has been employed successfully in two patient studies for the quantitation left-to-right shunting and the measurement of right and left ventricular ejection fractions. These types of studies will be expanded and further evaluated. (ERA citation 07:048140)

DE82012467 PC **A04**/MF **A01**
Brookhaven National Lab., Upton, NY.
Biomedical Research Applications of Electromagnetically Separated Enriched Stable Isotopes.
R. M. Lambrecht. 1982, 61p BNL-31100, CONF-820233-2
Contract AC02-76CH00016
National Research Council workshop on stable isotopes and derived radioisotopes, Washington, DC, USA, 3 Feb 1982, Portions of document are illegible.

The current and projected annual requirements through 1985 for stable isotopes enriched by electromagnetic separation methods were reviewed for applications in various types of biomedical research: (1) medical radioisotope production, labeled compounds, and potential radiopharmaceuticals; (2) nutrition, food science, and pharmacology; (3) metallobiochemistry and environmental toxicology; (4) nuclear magnetic resonance, electron paramagnetic resonance, and Moessbauer spectroscopy in biochemical, biophysical, and biomedical research; and (5) miscellaneous advances in radioactive and non-radioactive tracer technology. Radioisotopes available from commercial sources or routinely used in clinical nuclear medicine were excluded. Priorities and summaries are based on statements in the references and from answers to a survey conducted in the fall of 1981. Current requirements for enriched stable isotopes in biomedical research are not being satisfied. Severe shortages exist for exp 26 Mg, exp 43 Ca, exp 70 Zn, exp 76 Se, exp 77 Se, exp 78 Se, exp 102 Pd, exp 111 Cd, exp 113 Cd, and exp 190 Os. Many interesting and potentially important investigations in biomedical research require small quantities of specific elements at high isotopic enrichments.

DE82012468 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Stochastic Modelling of Physiologic Processes with Radiotracers and Positron Emission Tomography.
A. Rescigno, R. M. Lambrecht, and C. C. Duncan. 1982, 16p BNL-31102, CONF-820354-1
Contract AC02-76CH00016
Conference on applications of physics to medicine and biology, Trieste, Italy, 30 Mar 1982.

The compartment model, so often used in nuclear medicine and in pharmacokinetics, is formed by a set of linear differential equations of order one with constant coefficients; its validity depends upon the hypothesis that the system described contains a finite number of components, and that each component is homogeneous. These hypotheses exclude the presence of diffusion and of age-dependent processes, or in general of transport of a non-Markovian nature. The fact that frequently the experimental data agree with this model does not necessarily prove the model is appropriate, but only that it is flexible. In addition to the consistency with the experimental data, an obvious conceptual requirement of the model is that its parameters could be interpreted in terms of perceivable physical properties. All this considered, it will be demonstrated that the experimental data can be examined in terms of a model making a minimum number of assumptions and giving the best physical interpretations to the parameters involved. By way of example, a high resolution positron emission tomograph will be used to determine the successive moments describing the blood circulation through different sections of the brain. Whereever the relative moments form a geometric progression, the circulation in that section follows the rules of a perfect compartment; if this is not the case, the analytical method described can be used to describe the behavior of a tracer particle in the part of the organ.

DE82780331 PC **A05**/MF **A01**
Universidade Federal do Maranhao, Sao Luis (Brazil). Centro de Ciencias da Saude.
Use of Radiocolloids for the Evaluation of the Liver Macrophagic Junction.
W. M. Silva. 1980, 78p INIS-mf-6757
In Portuguese.
U.S. Sales Only. Microfiche only after original copies are exhausted.

By using gelatin traced with 113m-In, the author shows in this monograph, through the scintigraphic method, the following: 1. the utility of radiocolloids on evaluating the liver macrophagic function; 2. the liver macrophagic function in some hepatic diseases and its degree of damage; 3. the mechanism of the abnormal scintigraphic aspect in the liver diseases. (Atomindex citation 13:647724)

DE82780333 PC **A07**/MF **A01**
Amsterdam Univ. (Netherlands).
Radioimmunological Determination of Vasopressin in Urine.
M. J. van der Horn. 12 Feb 81, 147p INIS-mf-6813
In Dutch.Thesis.
U.S. Sales Only.

This thesis describes the development of a radioimmunoassay (RIA) for antidiuretic hormone (ADH) or vasopressin, which can be used for the quantitative measurement of the urinary excretion of the hormone in man during physiological and pathological conditions. The final RIA method, using approximately 5 pg exp 125 I-AVP diluted (1 : 50,000) antiserum 121 and charcoal-dextran separation of the antibody-bound and free fractions, is found to be specific for vasopressin and closely related substances; the sensitivity is 9 pg. The validity is demonstrated and the results of measurements of vasopressin excretion in urine from 39 normal subjects, including 4 children are presented. (Atomindex citation 13:647743)

DE82780334 MF **A01**
Vrije Univ., Amsterdam (Netherlands).
Non-Invasive Examination of Multiple Sclerosis Patients. A Study with Computer Tomography and Evoked Response Examination.
A. W. de Weerd. 24 Jun 81, 121p INIS-mf-6818
In Dutch.Thesis.
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

Multiple sclerosis is characterized by a wide range of symptoms and, in many cases, by a highly erratic course. As a result diagnosis is often a problem. Two non-invasive examinations, Computer Tomography (CT scan) and the Evoked Response test (ER), are the subjects of this study. According to available literature, both can play a role in the establishment of the diagnosis of multiple sclerosis. Clinical trials have been performed and both methods demonstrated abnormalities of the central nervous system which were not suspected on clinical grounds; as a result both methods of examination can contribute to the early establishment of the diagnosis of multiple sclerosis. In addition the diagnosis can be determined with greater certainty when the findings of the CT-scan and the evoked response test are taken into consideration. (Atomindex citation 13:647851)

DE82780335 MF **A01**
Vrije Univ., Amsterdam (Netherlands).
Dynamic Myocardial Scintigraphy with exp 123 I-Labelled Free Fatty Acids.
E. E. van der Wall. 19 Jun 81, 116p INIS-mf-6817
Thesis.
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

In this thesis, long-chain radioiodinated free fatty acids (exp 123 I-FFA), 16-iodo- exp 123 I-cis- delta exp 9 - hexadecenoic acid (exp 123 I-HA) and 17-iodo- exp 123 I-heptade-canoic acid (exp 123 I-Hsup(o)A), were employed for myocardial scintigraphy in patients with coronary artery disease. The results indicate that clearance of exp 123 I-FFA from the myocardium is dependent on the nature of ischemic injury. Clearance is delayed if the injury is reversible and accelerated in case of irreversible ischemia. Mechanisms responsible for divergent behaviour of FFA in patients with acute myocardial infarction versus patients with angina pec-

toris are purely speculative. This differential clearance from normally perfused, transiently ischemic and infarcted myocardium has practical application. The test provides a means to assess the nature of ischemic injury rapidly. These findings may have major consequences for logical management of patients presenting with chest pain and suspected coronary artery disease. (Atomindex citation 13:647867)

DE82780458 MF **A01**
Kyoto Univ., Osaka (Japan). Research Reactor Inst.
Selective Thermal Neutron Capture Therapy of Cancer Cells Using Their Specific Functional Differentiation.
Y. Mishima, T. Shibata, and T. Sato. Jan 80, 114p
KURRI-TR-195
In Japanese.
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

Separate abstracts were prepared for individual papers.

HRP-0904296/1 PC **A03**/MF **A01**
Camino Real Health Systems Agency, Inc., San Antonio, TX.
Annual Implementation Plan for the Camino Real Health Service Area, 1981.
Sep 81, 27p
Grant PHS-06-P-000203-06

Camino Real Health Service Area 9 is composed of 21 counties in south central Texas. (Refer to Map.) The major urban area is the San Antonio Standard Metropolitan Statistical Area. Other primary communities are Del Rio, Seguin, New Braunfels, and Kerrville. The 1980 Census counted 1,349,415 persons living in HSA 9, a growth of 22.6 percent since 1970. The population is 48.3 percent Anglo, 46.1 percent Mexican-American, and 5.6 percent Black. Major causes of death in 1979 were diseases of the heart and cancer. In potential years of life lost due to mortality, motor vehicle accidents ranked first and cancer again ranked second. The AIP presents short-term strategies for implementing activities which will begin to achieve the long range objectives identified in the HSP. These long range objectives are expressions of community desires for changes in the health care delivery system, and are grouped into four levels of priority.

HRP-0904299/5 PC **A07**/MF **A01**
Health Resources Administration, Hyattsville, MD. Office of Graduate Medical Education.
Physician Requirements-1990 for Hematology/Oncology,
Octavious Tracy, and Ralph D. Morris. 1981, 129p
Portions of this document are not fully legible.

The purpose of this enterprise was to provide exposition and an updated refinement of the GMENAC estimate of physician workforce requirements for 1990. GMENAC was chartered by the Secretary of Health, Education, and Welfare (currently Department of Health and Human Services) in 1976 to provide recommendations regarding changes in graduate medical education likely to achieve a balance in the specialty and geographic distribution of physicians, according to estimated needs of physician services. One of a series of specialty-specific monographs, this paper should serve as a resource to professional organizations, governmental planners and other groups of health policymakers in developing guidelines for graduate medical education, and planning for equitable access to health services for all segments of the United States population.

HRP-0904302/7 PC **A04**/MF **A01**
Ohio Dept. of Health, Columbus. Health Planning and Development Agency.
An Analysis of the Supply and Requirements for Primary Care Physician Services in Ohio.
Data analysis series no. 2,
Barbara J. Cooke. Jun 79, 61p
Contract PHS-05-P-000296

This study deviates from the approach of employing a physician-to-population ratio to assess the availability of primary care physician services. It estimates the supply of, and demand for, primary care visits in each of Ohio's 88 counties for a base year, 1975, and then predicts what they will be in 1985 and 1995. A shortage designation is made when the demand for services exceeds the supply. Then a comparison is made between the counties designated as shortage areas and those not designated as shortage areas. The methodology uses only published data making the analysis practical in terms of cost and time required. The study findings point not only to geographic but also specialty distribution. Policy strategies to better balance supply and demand include encouragement of health maintenance organizations, a quota of residency programs, decentralized health education, and financial incentives.

HRP-0904303/5 PC **A03**/MF **A01**
Ohio Dept. of Health, Columbus. Health Planning and Development Agency.
Temporary Nursing Personnel in Ohio: An Exploratory Analysis.
Data analysis series no. 1,
Barbara J. Cooke. May 79, 32p
Contract PHS-05-P-000296

The preliminary investigation examined the use of supplemental nurses and its possible effect on the labor market and on cost, continuity, and quality of patient care. Sixteen key professionals including hospital and nursing home administrators, employer associations, nursing administrators, and supplemental staffing agency administrators were interviewed. A literature review found few existing studies on the use of supplemental agency personnel in hospitals and nursing homes. Pertinent data and information was collected from other states' experiences. Ohio-specific data was collected through an examination of various survey findings and information from telephone directories. The report of this investigation presents a brief description of the functions and distribution of commercial staffing pools and employer reactions to pool utilization.

HRP-0904304/3 PC **A03**/MF **A01**
Institute for Health Planning, Inc., Madison, WI.
Health Promotion: Its Status in the Medical Community,
Jane Thomas. Jun 82, 45p
Contract PHS-HRA-232-79-0036

The report provides a historical prespective on health promotion, defines some of the major terms used in the health promotion movement, and describes the status of health promotion in four major types of medical institutions: hospitals, health maintenance organizations, nursing homes, and freestanding wellness centers. For each institutional setting, the paper presents the reader with the background as to why these various institutions became involved in health promotion activities, the services they provide, organizational and staffing patterns, target audiences, and some of the cost and financing issues. Completing each section are case examples which illustrate how specific institutions have incorporated health promotion into their operations. The final section of the document concludes with an analysis of the barriers to, and facilitators of, the expansion of health promotion in the medical setting.

HRP-0904305/0 PC **A04**/MF **A01**
Comprehensive Health Planning Council of Southeastern Michigan, Inc., Detroit.
Project Review Criteria and Standards for Computed Tomographic (CT) Scanners in Southeastern Michigan (Revised).
c1982, 56p
Grant PHS-HRA-05-P-000235-06

The criteria and standards in this document provide the basis for review of proposals to establish, expand, or alter the installation and use of computed tomographic (CT) scanners. Following a general discussion and definition of CT scanners and their use, criteria and standards are listed by 8 categories. The respective numbers of criteria and standards for each category are demonstrated community need (1 criterion, 10 standards); accessibility (2, 4); ability to staff and operate (5, 6); physical design and equipment (2, 1); quality of care (1, 1); continuity of care (1 criterion); financial issues (5, 15); and economic issues (4, 2). Rationale for the criteria is discussed. Measurable data or specific performance targets are provided in the standards.

N82-28165/0 PC **A02**/MF **A01**
Victoria Univ. (British Columbia). Dept. of Physics.
Beam Optical Properties of the Magnetic Field Produced by Two Coaxial Coils.
D. E. Lobb. Oct 80, 24p TRI-PP-80-31

The beam optical properties of channels consisting of two coaxial coils are presented for various ratios of total currents in the two coils and for various source locations. For the purpose of irradiating a volume of specified depth, it is shown that an axial line source produces a concentration of trajectories on axis throughout the volume. The role of energy loss and scatter of pions in a material medium for cones of rays converging onto a symmetry axis is examined, and it is shown that the energy loss per unit volume has a maximum near where the unscattered rays would intersect the axis.

PB82-191933 PC **A03**/MF **A01**
National Center for Health Statistics, Hyattsville, MD. Div. of Vital Statistics.
National Ambulatory Medical Care Survey, 1980. Public Use Data Tape Documentation,
James E. Delozier, and Raymond O. Gagnon. Jun 82, 39p NCHS/DF-82/017A
For system on magnetic tape, see PB82-191941.

The National Ambulatory Medical Care Survey (NAMCS) provides data on ambulatory medical care rendered in physicians' offices. The NAMCS is a continuous survey based on a sample of patient visits to a national sample of office-based physicians. The survey obtains information on the volume of office visits by age, race, and sex of the patient and by selected physician characteristics such as type of specialty and practice and geographic location. Data describing the clinical substance of the visits include the patient's problem or complaint, prior visit status, referral status, major reason for visit, ethnicity of the patient, physician's diagnosis, diagnostic and therapeutic services provided, disposition, and duration of the visit. The patient's problem or complaint is coded according to a revised symptom classification developed specifically for NAMCS. The physician's diagnosis is coded according to the 'International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM).' The medication therapy, or drugs provided, are coded according to 'The Collection and Processing of Drug Information, National Ambulatory Medical Care Survey, United States, 1980.' In 1980 NAMCS sampled about 46,000 patient records from the 1,870 doctors who participated in the survey.

PB82-191941 CP **T02**
National Center for Health Statistics, Hyattsville, MD.
National Ambulatory Medical Care Survey, 1980.
Data file,
James E. Delozier, Raymond O. Gagnon, and Malcolm C. Graham. 31 Dec 80, mag tape NCHS/DF-82/017
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, tract, density, and parity. Call NTIS Computer Products if you have questions. Price includes documentation.

The National Ambulatory Medical Care Survey (NAMCS) provides data on ambulatory medical care rendered in physicians' offices. The NAMCS is a continuous survey based on a sample of patient visits to a national sample of office-based physicians. The survey obtains information on the volume of office visits by age, race, and sex of the patient and by selected physician characteristics such as type of specialty and practice and geographic location. Data describing the clinical substance of the visits include the patient's problem or complaint, prior visit status, referral status, major reason for visit, ethnicity of the patient, physician's diagnosis, diagnostic and therapeutic services provided, disposition, and duration of the visit. The patient's problem or complaint is coded according to a revised symptom classification developed specifically for the NAMCS. The physician's diagnosis is coded according to the 'International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM).' The medication therapy, or drugs provided, are coded according to 'The Collection and Processing of Drug Information, National Ambulatory Medical Care Survey, United States, 1980.' In 1980 NAMCS sampled about 46,000 patient records from the 1,870 doctors who participated in the survey.

PB82-224395 PC **A14**/MF **A01**
Pennsylvania Univ., Philadelphia.
Hospital Services Coordination: A Comparative Case Study of Triad and Care Program Management Systems. Executive Summary and Final Report.
Final rept. 1 Jul 80-30 Sep 81,
Bruce W. Herdman. 1982, 314p NCHSR-82-41

Grant PHS-HS-04247
Doctoral thesis.

This dissertation presents a theory of hospital service coordination systems in large medical school hospitals. The research problem was to develop a systemic understanding of how Triad Management and Care Program Management systems are constituted and how they function in large, complex hospitals. Data were collected primarily via extensive observation of two clinical departments at four 700 bed, tertiary care, medical school hospitals. The Constant Comparative Method was used to ensure systematic and less subjective selection and evaluation of data. A product of the research is a pattern model which describes five themes and their interactions: Differentiation, individual and cultural sources; Professional Dominance, variation important to management; Environment Induced Variation; the Historical Present and Present Future; Individuals' Influence. These variables should be considered by managers considering implementation or refinement of decentralized management systems.

PB82-249749 PC **A03**/MF **A01**
National Research Council, Washington, DC.
Nutritional Surveillance: A Synopsis.
Final rept.
1982, 31p
Contract AID/ta-C-1428

Nutritional surveillance is defined as watching over nutritional status in order to make decisions on policies and programs that are aimed at improving the nutrition of poor populations. Data must be collected regularly and be readily interpretable for policy and program planners, and the agencies involved must be closely linked to the mechanisms of planning and intervention. Surveillance serves three general purposes (1) monitoring changes in indicators for purposes of planning to improve nutrition, (2) evaluating nutritional effects of programs and (3) providing early warning and intervention to prevent epidemic inadequacies in food consumption. Based on experience since 1975, the most promising approaches in nutritional surveillance involve the use of existing resources for data collection. Those countries with the lowest incomes and minimal development of statistical services will generally have to use data available from routine services; those with more developed institutional data collection and analysis capacities can include surveys.

PB82-249756 PC **A03**/MF **A01**
National Research Council, Washington, DC.
Nutritional Components of a Primary Health Care Delivery System.
Final rept.
1982, 49p
Contract AID/ta-C-1428

This report focuses on the nutrition component of an integrated health care system. Such a system should be based on expressed concern and active participation of the community, the identification of prevalent health and nutrition problems, and an approach to their solution through appropriate technology applied by community workers and traditional practitioners. The report outlines a strategy for introducing a nutrition component, training of primary health care workers, evidence of success of primary health care programs with a nutrition component and research needed to improve the performance of primary health care workers in promoting nutrition at the local level. Minimum responsibilities in the area of nutrition relate mainly to improved food consumption and utilization.

PB82-251190 PC **A02**/MF **A01**
North Carolina Univ. at Chapel Hill.
The 1979 Mexico National Fertility and Mortality Survey: A Summary of Results.
Summary Series no. 2.
Dec 80, 24p AID-PN-AAJ-384
Contract AID/DSPE-C-0025

In 1977 Mexico established a national family planning plan aimed at reducing the country's 3.2% annual population growth rate to 2.5% by 1982 and to 1.0% by 2000. This report summarizes the findings of a 1979 National Fertility and Mortality Survey indicating progress towards these goals. The survey was multipurpose and used a two-part questionnaire: one part seeking basic demographic data from 18,505 representative households; the other collecting information on fertility, infant mortality, and related matters from 20,482 women aged 15-49 years in those same households. The survey showed that, despite evidence of a slight tendency towards aging in comparison with 1970 and 1976 data, Mexico's population is still relatively young, with 45.3% under age 15 and only 3.9% aged 65 and over.

PB82-253717 PC **A06**/MF **A01**
Illinois Univ. at the Medical Center, Chicago.
Health Effects Due to the Cessation of Chlorination of Wastewater Treatment Plant Effluents.
Final rept.,
Janet A. Holden. Mar 81, 112p IINR-81/14

Very small, or 'inhalable,' particulates are suspected of being a major cause of adverse human health effects. This report examines the currently available information on inhalable particulates occurring in Illinois and discusses potential health impacts. The research will be useful in assessing the impacts of inhalable particulate regulations if adopted by the federal government.

PB82-254772 PC **A18**/MF **A01**
Century Research Corp., Arlington, VA.
Problems in Occupational Safety and Health: A Critical Review of Select Physical and Psychological Factors. Volume II.
Dec 73, 425p NIOSH/HSM-99-72-043
Contract PHS-HSM-99-72-043

This volume contains a listing of research centers, indexes necessary for locating desired references, and abstract cards containing the references. The list of research centers contains the names of places and people who have performed or have a capability in research on personal factors in occupational health and safety. Many of those listed have responded to a direct inquiry for the information; others have been identified from other sources such as directories, literature, and surveys of work in progress. The centers are listed alphabetically by the state in which they are located; the listing of foreign centers follows that for the United States.

PB82-255522 PC **A15**/MF **A01**
Purdue Univ., Lafayette, IN.
The Use of Health Services: Indices and Correlates. A Research Bibliography 1981 - Executive Summary and Final Report.
Rept. for 1 Jul 79-31 Oct 80,
Cheryl A. Maurana, Robert L. Eichhorn, and Lynne E. Lonnquist. Nov 81, 339p NCHSR-82-65
Grant PHS-HS-03995

The purpose of the project was to revise and update The Utilization of Health Services: Indices and Correlates, prepared by Lu Ann Aday and Robert L. Eichhorn in 1972 (DHEW Pub. No. HSM 73-3003). A total of 265 books and articles published between 1974 and 1981 were abstracted and analyzed. The bibliography contains four sections and an author index. Section 1 is a classification of the indices and correlates of the use of health services. Section 2 is a summary of the indices of use and the most important trends in the use of services. Section 3 lists the correlates of use and summarizes important findings from the literature. Section 4 contains comprehensive abstracts of each of the 265 books and articles.

PB82-257593 PC **A23**/MF **A01**
Cincinnati Univ., OH.
Media Coverage of Events Relating to the Swine Flu Program,
Michael Porte, and Ernest Weiler. 15 Jul 77, 539p
HHS/CDC/CHPE-81-0179
Contract DHEW-200-77-0706

Detailed analyses are offered of media coverage of the Swine Flu Immunization Program and related events. Most data were collected from January 1976 to February 1977. Coverage was rated as either 'positive,' 'balanced,' or 'negative'. Sources surveyed were 4 newspapers with the largest circulation in the 4 regions of the country, 39 regional newspapers, the nightly news programs on the 3 television networks (as well as the 'Today' show), magazines, editorial cartoons, and religious newsletters and religious wire service stories.

PB82-922800 Standing Order
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Oncology Overview OT Series.
1982, open series
Supersedes PB81-922800.
Paper copy available on Standing Order, Deposit Account required. North American Continent price $2.00/each issue; all others write for quote. Single copies also available in paper or microfiche.

The overview series is a product of the International Cancer Research Data Bank (ICRDB) program of the National Cancer Institute. Each overview publication in this series contains abstracts of articles dealing with topics concerned with therapy. The purpose of these overviews is to facilitate and promote the exchange of information between cancer scientists. The material published in an overview is obtained from Cancerline, an on-line cancer information system. A subscriber to this series will receive approximately ten titles per year. These titles will then be updated either on a 12 or 24 month cycle.

PB82-922801 PC**$6.50**/MF**$3.00**
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Support Care of the Cancer Patient: Management of Infectious and Hematologic Complications.
Oncology overview.
Aug 82, 117p NCI/ICRDB/OT-82/01

Oncology Overviews are a service of the International Cancer Research Data Bank (ICRDB) Program of the National Cancer Institute, intended to facilitate and promote the exchange of information between cancer scientists by keeping them aware of literature related to their research being published by other laboratories throughout the world. Each Oncology Overview represents a survey of the literature associated with a selected area of cancer research. It contains abstracts of articles which have been selected and organized by researchers associated with the field. Contents: Infections in cancer patients; Blood component transfusions in cancer patients; Bone marrow transplantation in cancer patients; Protected environments in management of cancer; Management of disseminated intravascular coagulation in cancer.

PB82-922802 PC**$6.00**/MF**$3.00**
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Treatment of Prostatic Cancer.
Oncology overview.
Aug 82, 91p NCI/ICRDB/OT-82/02

Oncology Overviews are a service of the International Cancer Research Data Bank (ICRDB) Program of the National Cancer Institute, intended to facilitate and promote the exchange of information between cancer scientists by keeping them aware of literature related to their research being published by other laboratories throughout the world. Each Oncology Overview represents a survey of the literature associated with a selected area of cancer research. It contains abstracts of articles which have been selected and organized by researchers associated with the field. Contents: Surgical treatment of prostatic cancer; Radiation therapy treatment of prostatic cancer; Hormonal therapy of prostatic cancer; Chemotherapy of prostatic cancer; Immunotherapy in the treatment of prostatic cancer; Palliative therapy of osseous metastases of prostatic cancer.

PB82-922803 PC**$4.50**/MF**$3.00**
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Diagnosis and Treatment of Bronchoalveolar Cancer of the Lung.
Oncology overview.
Aug 82, 43p NCI/ICRDB/OT-82/03

Oncology Overviews are a service of the International Cancer Research Data Bank (ICRDB) Program of the National Cancer Institute, intended to facilitate and promote the exchange of information between cancer scientists by keeping them aware of literature related to their research being published by other laboratories throughout the world. Each Oncology Overview represents a survey of the literature associated with a selected area of cancer research. It contains abstracts of articles which have been selected and organized by researchers associated with the field. Contents: Diagnosis and prognosis of bronchoalveolar cancer of the lung; Treatment of bronchoalveolar cancer of the lung; Miscellaneous clinical studies of bronchoalveolar cancer of the lung.

PB82-922902 PC**$5.25**/MF**$3.00**
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.

Age Related Factors Which May Predispose to Carcinogenesis.
Oncology overview.
Aug 82, 61p NCI/ICRDB/OK-82/02

Contents: Age-related changes in the nucleus which may indicate increased predisposition to carcinogenesis; Age-related changes in DNA repair which may predispose to carcinogenesis; Cellular changes during aging in vitro; Age-related changes in immune capability which may predispose to carcinogenesis; Animal studies of increased cancer incidence with age and other possible predisposing factors; Age-related changes in metabolism of and susceptibility to carcinogenic agents; Epidemiological studies of age-related changes and cancer incidence.

PB82-923002 PC**$6.00**/MF**$3.00**
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Virus Latency and Oncogenesis.
Oncology overview.
Aug 82, 81p NCI/ICRDB/OB-82/02

Oncology Overviews are a service of the International Cancer Research Data Bank (ICRDB) Program of the National Cancer Institute, intended to facilitate and promote the exchange of information between cancer scientists by keeping them aware of literature related to their research being published by other laboratories throughout the world. Each Oncology Overview represents a survey of the literature associated with a selected area of cancer research. It contains abstracts of articles which have been selected and organized by researchers associated with the field. Contents: Latent virus activation; Immunologic aspects of viral latency; Detection methods for latent viruses; RNA virus latency and oncogenesis; DNA virus latency and oncogenesis; Slow viruses; Reviews and general articles on virus latency and oncogenesis.

6F. Environmental Biology

AD-A117 385/5 PC **A04**/MF **A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS. Environmental Lab.
Large-Scale Operations Management Test of Use of the White Amur for Control of Problem Aquatic Plants. Report 1. Baseline Studies. Volume VIII. Summary of Baseline Studies and Data.
Technical rept.,
Eldon C. Blancher, and Eugene G. Buglewicz. May 82, 55p Rept no. WES/TR/A-78-2-VOL-8
See also Volume 7, AD-A069 897.

This report summarizes the baseline environmental conditions in Lake Conway, Florida, for the 20-month period, January 1976-August 1977. A brief history of the Large-Scale Operations Management Test--Lake Conway (LSOMT) is presented. Investigations dealing with the aquatic macrophytes, fish, mammals, waterfowl, plankton, benthos, water quality, herpetofauna, and mathematical modeling efforts to describe the lake's ecosystem prior to the introduction of the white amur are summarized. (Author)

AD-A117 528/0 PC **A13**/MF **A01**
Tetra Tech, Inc., Bellevue, WA.
Environmental Aspects of Artificial Aeration and Oxygenation of Reservoirs: A Review of Theory, Techniques, and Experiences.
Final rept. Jan 72-Dec 80,
Robert A. Pastorok, Marc W. Lorenzen, and Thomas C. Ginn. May 82, 280p WES-TR-E-82-3
Contract DACW39-80-C-0080
Report on Environmental and Water Quality Operational Studies.

Artificial circulation and hypolimnetic aeration have been used successfully in management of eutrophic reservoirs to alleviate water quality problems, control algal blooms, and improve fish habitat. this report includes: (a) a comprehensive review of aeration/circulation techniques and past experiences encompassing literature from January, 1972, through December, 1980; (b) statistical analyses of artificial circulation experiences to examine the causes of alternative responses to treatment; (c) a summary of morphometric and water quality data for 107 reservoirs by the U.S. Army Corps of Engineers; and (d) a generic evaluation procedure for alternative management applications in reservoirs.

AD-A117 875/5 PC **A03**/MF **A01**
Engineering-Science, Inc., Arcadia, CA.
Vapor Condensation Control of JP-4 Emissions from Underground Storage Tanks at March Air Force Base, California.
Final rept. Sep-Oct 81,
Donald R. Holtz, and Lawrence C. Cottone. May 82, 38p AFESC/ESL-TR-82-01
Contract F33615-80-D-4001

Three efficiency test runs were conducted on an Edwards Engineering Corporation Hydrocarbon Vapor Recovery Unit Model DE 1000 at the March Air Force Base Panero refueling area on 22 and 23 September and 1 October 1981. The recovery system was installed to control JP-4 vapors displaced from the filling of underground tanks. The purpose of the test was to assess the compliance with South Coast Air Quality Management District Rule 462 specifying minimum efficiencies for vapor condensation systems. (Author)

DE82011525 MF **A01**
Brookhaven National Lab., Upton, NY.
Health-Risk Assessment of Energy Technologies.
S. C. Morris, P. D. Moskowitz, M. D. Rowe, and L. D. Hamilton. 1981, 19p BNL-30746, CONF-811159-3
Contract AC02-76CH00016
109. annual meeting of the American Public Health Association, Los Angeles, CA, USA, 1 Nov 1981, Portions of this report are illegible.
Best available copy from document source. Available in microfiche only.

Risk assessment aims at improving the decision-making base for policy makers and public. It provides information directly useful for broad energy policy decisions, for decisions on specific proposed facilities and for guiding health and environmental research. Risk assessment organizes information from a variety of sources into a coherent framework that treats all forms of energy consistently. Analyzing health risks of energy requires a recognition of the wise gaps in current knowledge and attempts to assess their importance. There is no single method which provides a full spectrum of answers. Energy impacts span a wide range, from the public health impacts of pollution, to the hazard of occupational disease, to the potential for large scale, catastrophic accident. Selection of appropriate methods requires careful identification of specific questions and model capabilities. This paper describes a hierarchy of methods, each appropriate to a different level or type of analysis. First, a set of analytical tools which draw on engineering, epidemiology, toxicology, meteorology, air chemistry, demography, statistics, etc, are discussed. Second, two basic approaches used to organize these tools, trajectory analysis which traces energy and materials flows from source to ultimate use and a risk-accounting approach are presented. The latter uses input-output analysis which examines demands that construction and operation of an energy technology place on the economy as a whole and their associated risks. (ERA citation 07:051580)

DE82013372 PC **A05**/MF **A01**
Oak Ridge National Lab., TN.
Initial Atmospheric-Dispersion Modeling in Support of the Multiple-Site Incineration Study.
G. A. Holton, C. A. Little, F. R. O'Donnell, E. L. Etnier, and C. C. Travis. Apr 82, 91p ORNL/TM-8181
Contract W-7405-ENG-26
Portions of document are illegible.
Microfiche only after original copies are exhausted.

Several modeling series which estimate population exposure to stack emissions from incineration of hazardous organic materials at 22 commercial incinerator sites are presented. These modeling series can be divided into three groups. One group estimates long- and short-term atmospheric concentrations and population exposures for each of 22 sites. These modeling predictions can be used to assess chronic and acute exposure. The second group consists of sensitivity analyses which show the effect of changes in stack parameters on the number of people exposed to specified concentration levels. The third group compares concentration estimates of two atmospheric dispersion computer codes. Results of each modeling series are contained in the appendices of this report. (ERA citation 07:044653)

N82-27357/4 PC **A02**/MF **A01**
Weapons Systems Research Lab., Adelaide (Australia).
Asbestos as a Potential Health Hazard in Rocket Motor Technology.
A. Wilkie. Sep 81, 15p WSRL-0226-RE, AR-002-620

The presence of airborne asbestos fibers was monitored in areas used for static firing and post firing inspections of rocket motors and the manufacture of rocket motor components containing asbestos. In most locations, the concentration of asbestos fibers was found to be significantly below the present acceptable level in relation to asbestosis but in two areas special procedures are necessary. Fiber and dust removal equipment was installed and additional safety procedures were introduced.

PB82-248865 PC **E05**/MF **E05**
Water Research Centre, Stevenage (England).
Investigations of Sewage Discharges to Some British Coastal Waters. Chapter 5: Bacterial Distributions, Part 3.
Technical rept.,
A. L. H. Gameson. c1981, 58p TR-165

Results of field studies of the distributions of indicator bacteria (mainly presumptive total coliforms) at four sites are reported. These studies were carried out at Deal in 1969 and 1975, off North Foreland in 1967, along part of the North Wales coast in 1973, and at Eastbourne in 1977. (Copyright (c) Water Research Centre, 1981.)

PB82-248972 PC **E03**/MF **E03**
Water Research Centre, Stevenage (England).
Investigations of Sewage Discharges to Some British Coastal Waters. Chapter 5: Bacterial Distributions, Part 4.
Technical rept.,
A. L. H. Gameson. c1982, 61p TR-176
See also Part 2, PB81-237919.

Field studies were carried out at various coastal sites between 1961 and 1977 to obtain a better understanding of the behavior of sewage when discharged to the sea from submarine outfalls and of its effect on water quality, and hence to assist in decisions on schemes for disposal of sewage from coastal areas and on the methods of determining the optimum design for any given objectives. Chapter 5 of the present series of reports has been concerned with variations in bacterial counts in sewage, river discharges, and the sea, and Part 4 is confined to examination of variations in presumptive total coliform counts in the nearshore waters adjacent to sea outfalls. (Copyright (c) Water Research Centre 1982.)

PB82-249004 PC **E04**/MF **E04**
Water Research Centre, Stevenage (England).
Application of Coastal Pollution Research. 4 - Interpretation of Bacteriological Data.
Technical rept.,
A. L. H. Gameson. c1982, 44p TR-180

The variability in the concentration of bacterial indicators of sewage pollution in coastal waters makes it difficult to obtain representative values. The present report is concerned mainly with methods of summarizing field data, and of examining some of the sources of variability: it is not concerned with the more important problem of accounting for the general level of bacterial pollution in terms of site characteristics and pollution sources. (Copyright (c) Water Research Centre 1982.)

PB82-873340 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Toxicity of Arsenic. 1970-August, 1982 (Citations from the NTIS Data Base).
Rept. for 1970-Aug 82.
Aug 82, 283p
Supersedes PB82-854381.

This bibliography contains citations concerning the toxicity, carcinogenicity, environmental pollution, and other hazards and adverse effects of arsenic. The detection, characterization, analytical methods, standards, and means of removal from the environment are discussed. These aspects of arsenic are dealt with in relation to aquatic and terrestrial flora and fauna, including humans. (This updated bibliography contains 182 citations, 32 of which are new entries to the previous edition.)

PB82-873357 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Toxicity of Arsenic. 1976-August, 1982 (Citations from the Energy Data Base).
Rept. for 1976-Aug 82.
Aug 82, 260p
Supersedes PB82-854399.Prepared in cooperation with the Department of Energy, Washington, DC.

This bibliography contains citations concerning the toxicity, carcinogenicity, environmental pollution, and other hazards of arsenic. Environmental pollution assays, biological monitoring methods, and chemical assays for the detection of arsenic are discussed. Pollution from coal fired and geothermal power plants are considered. (This updated bibliography contains 204 citations, 49 of which are new entries to the previous edition.)

6H. Food

AD-A117 476/2 PC **A02**/MF **A01**
Army Natick Research and Development Labs., MA.
A Rationale for Evaluation and Selection of Antioxidants for Protection of Ration Items of Different Types.
Conference paper,
William L. Porter, John G. Kapsalis, Ann Marie Wetherby, Anne M. Drolet, and Edward D. Black. 18 Jun 82, 15p
Paper from the Proceedings of the Army Sciences Conference (1982), 15-18 Jun 82.

Rancidity resulting from autoxidation of lipids (oxidation with atmospheric oxygen) in military ration items is a prime cause of rejection. Odor, color, flavor, and texture are degraded. For nearly fifty years scientists have searched for effective antioxidants and means of rating this effectiveness. For the first forty years fats and oils were the lipids scrutinized. These are triglycerides of varying composition and are usually an artefact food, being expressed or extracted from plant or animal tissue. Frying oils, salad oils, lard and butter are examples. They have a low surface to volume ratio (LSV) and usually a low water content. Antioxidants were chosen for effectiveness in fats and oils and rated by accelerated shelf life tests using dry bulk fat or oil: the so-called Active Oxygen Method (AOM), Schaal Oven Test, and Oxygen Bomb Test. An antioxidant was considered uniformly good or bad, judged by these tests, with little regard for appropriateness in other lipids. For the last twenty years, there has been growing attention to the protection of lipids dispersed in processed, whole tissue foods and in combination foods like baked goods, instant foods, and emulsions of the salad oil and whipped topping type. This has been hastened by people's desire for quickly prepared convenience foods like TV or airline dinners, largely precooked and predisposed to autoxidation. The first oxidizing lipids in these foods are often polar lipids, like the phosphatides of membranes, or alternatively, highly emulsified triglycerides as in baked goods or whipped toppings.

DE82008314 MF **A01**
Purdue Univ., Lafayette, IN. Lab. of Renewable Resources Engineering.
Direct Enzymatic Extraction of Starch from Corn as an Energy-Saving Alternative to Production of High-Fructose Syrup. For the Quarter, January 1, 1981-March 31, 1981.
1982, 15p DOE/CS/40071-21
Contract AS02-78CS40071
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

The liquefaction of pre-gelatinized starch was studied with various analytical techniques to determine the effects of starch molecular weight, granule structure, granule size, and mechanical depolymerization. Also, improvements were made in the chromatographic system used to characterize starch hydrolysates. Progress is reported on protein removal. The effects of pH, temperature, and ionic strength were examined for the removal of protein from a syrup stream by adsorption on a phenolic resin. Buffered systems, which maintain more stable pH values, were also examined. Mathematical modeling of the results is in progress. The pilot plant facility is complete and in operation. Starch streams containing 1% protein are being produced by the protein extraction process. (ERA citation 07:047244)

N82-27988/6 PC **A04**/MF **A01**
Purdue Univ., Lafayette, IN.
Plant Diversity to Support Humans in a Celss Ground-Based Demonstrator.
J. M. Howe, and J. E. Hoff. Jun 82, 51p NASA-CR-166357, NAS 1.26:166357
Grant NSG-2401

Factors that influence the human nutritional requirements envisioned in a controlled ecological life support system ground-based demonstrator and on bioavailability experiments of Ca, Fe and Zn are discussed. The interrelationhip of protein and magnesium on Ca retention is also described.

PB82-255381 PC **A06**/MF **A01**
National Food Processors Association, Berkeley, CA.
Tomato Cleaning and Water Recycle.
Final rept. Jul 74-Mar 77,
Walter W. Rose. Apr 82, 106p EPA-600/2-82-059
Grant EPA-S-803251

A full-scale dump tank water recycle system was developed and demonstrated. A false bottom-ejector transport system removed soil from the water. Clarified water was either recycled back to the dump tank or discharged to the sewer. A vacuum belt was developed for dewatering the mud prior to final disposal. Two types of rubber disc machines were evaluated for the cleaning of tomatoes. Both were found to be effective in cleaning the tomato surfaces using minimal amounts of water.

PB82-855990 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Plastic Bottles Used in the Food Industry. July, 1972-August, 1982 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jul 72-Aug 82.
Aug 82, 191p
Supersedes PB80-850233.Prepared in cooperation with the International Food Information Service, Frankfurt am Main (Germany, F.R.).

This bibliography contains citations concerning the production and utilization of plastic bottles by the food industry. Equipment for the production, filling, capping, and labelling are considered. Marketing and legislation are discussed. The analysis and toxicology of migrated monomers and stabilizers are also addressed. (This updated bibliography contains 219 citations, 60 of which are new entries to the previous edition.)

PB82-873183 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Brewers Yeast and Fermentation Processes. 1972-August, 1982 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for 1972-Aug 82.
Aug 82, 245p
Supersedes PB81-880429.Prepared in cooperation with the International Food Information Service, Frankfurt am Main (Germany, F.R.).

This bibliography contains citations concerning yeast fermentation, fermentor design, and brewing technology. Pressurized fermentation, continuous fermentation, bottom fermentation processes, and high capacity outdoor fermentors are discussed. Numerous brewers yeast strains are considered. (This updated bibliography contains 241 citations, 176 of which are new entries to the previous edition.)

PB82-873365 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Pectolytic Enzymes in Foods. February, 1972-August, 1982 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Feb 72-Aug 82.
Aug 82, 144p
Supersedes PB80-850068.Prepared in cooperation with the International Food Information Service, Frankfurt am Main (Germany, F.R.).

This bibliography contains citations concerning the use of pectolytic enzymes by the food industry. Enzyme sources and methods and equipment for enzyme production are discussed. The biochemistry, applications in food processing, particularly in the preparation and clarification of fruit juices and wines, and the role of these enzymes in plant diseases are considered. (This updated bibliography contains 144 citations, 83 of which are new entries to the previous edition.)

PB82-873589 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Waste Treatment: Beverage Industry. 1972-August, 1982 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for 1972-Aug 82.
Aug 82, 242p
Supersedes PB80-803554.Prepared in cooperation with the International Food Information Service, Frankfurt am Main (Germany, F.R.).

This bibliography contains citations concerning the treatment of effluents from beverage industry processes. Particular emphasis is on brewery and winery effulent treatment. Characteristics of the waste products and pre-treatment and treatment methods are discussed. Regulations governing waste disposal are also considered along with the economics of waste disposal. (This updated bibliography contains 287 citations, 185 of which are new entries to the previous edition.)

PB82-873928 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Corn Starch: Properties and Processing. 1972-August, 1982 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for 1972-Aug 82.
Aug 82, 163p
Supersedes PB82-855347.Prepared in cooperation with the International Food Information Service, Frankfurt am Main (Germany, F.R.).

This bibliography contains citations concerning corn starch processing. The physical and chemical properties, and nutritive value of corn starch and corn starch products are considered. Studies of Gamma irradiated corn starch are included. (This updated bibliography contains 156 citations, 14 of which are new entries to the previous edition.)

PB82-873936 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Retortable Food Pouches. 1972-August, 1982 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for 1972-Aug 82.
Aug 82, 84p
Supersedes PB81-869349.Prepared in cooperation with the International Food Information Service, Frankfurt am Main (Germany, F.R.).

This bibliography contains citations concerning various aspects of retortable food pouches. The technology, production, testing, sterilization, storage stability, and applications are considered. (This updated bibliography contains 88 citations, 22 of which are new entries to the previous edition.)

PB82-873977 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Disinfectants Used in the Food Industry. 1972-August, 1982 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for 1972-Aug 82.
Aug 82, 281p
Supersedes PB82-854548.Prepared in cooperation with the International Food Information Service, Frankfurt am Main (Germany, F.R.).

This bibliography contains citations concerning various chemical disinfectants used by the food industry. Residue analysis, bacterial activity, equipment, toxicology, and legislation are considered. (This updated bibliography contains 303 citations, 18 of which are new entries to the previous edition.)

PB82-874058 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.

Snack Food Manufacture. 1972-August, 1982 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for 1972-Aug 82.
Aug 82, 137p
Prepared in cooperation with the International Food Information Service, Frankfurt am Main (Germany, F.R.).

This bibliography contains citations concerning manufacturing methods and product development of snack foods. Specific products, including their composition, and patent information are included. Organoleptic evaluations are considered. (Contains 177 citations fully indexed and including a title list.)

PB82-874116 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Fruit Processing. 1972-August, 1982 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for 1972-Aug 82.
Aug 82, 107p
Supersedes PB81-870636.Prepared in cooperation with the International Food Information Service, Frankfurt am Main (Germany, F.R.).

This bibliography contains citations concerning processes, equipment and patents pertinent to fruit processing. Destoning, peeling, paring, pressing, centrifugation, filtration, co-extrusion, drying, 'hot' and 'cold' pressing and freezing are among the processing methods discussed. Chemical approaches to degreening, sterilization, ripening enhancement, and preservation are considered. (This updated bibliography contains 119 citations, 19 of which are new entries to the previous edition.)

PB82-874140 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Cereals: Nutritional Value. 1972-August, 1982 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for 1972-Aug 82.
Aug 82, 109p
Prepared in cooperation with the International Food Information Service, Frankfurt am Main (Germany, F.R.).

This bibliography contains citations concerning the nutritive value and factors affecting the nutritive value of cereals. Cereal processing methods and vitamin, mineral, and protein loss are discussed. Fiber content of cereal products and their effects on health are also considered. The relative protein value of numerous cereals are included. (Contains 104 citations fully indexed and includes a title list.)

6J. Industrial (Occupational) Medicine

DE82008624 PC **A04**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Guidance for Implementing an Environmental, Safety, and Health-Assurance Program. Volume 15. A Model Plan for Line Organization Environmental, Safety, and Health-Assurance Programs.
A. C. Ellingson, and C. A. Trauth, Jr. Jan 82, 68p
SAND-81-0646
Contract AC04-76DP00789
Portions of document are illegible.

This is 1 of 15 documents designed to illustrate how an Environmental, Safety and Health (ES and H) Assurance Program may be implemented. The generic definition of ES and H Assurance Programs is given in a companion document entitled An Environmental, Safety and Health Assurance Program Standard. This particular document presents a model operational-level ES and H Assurance Program that may be used as a guide by an operational-level organization in developing its own plan. The model presented here reflects the guidance given in the total series of 15 documents. (ERA citation 07:043813)

DE82010870 PC **A05**/MF **A01**
Carnegie Inst. of Tech., Pittsburgh, PA.
Assessment of Health, Safety, and Environmental Impacts of DOE Coal Conversion Processes. Second Technical Progress Report, April 1-September 30, 1981.
J. E. Bratina, J. C. Craun, J. P. Fillo, I. A. Jefcoat, and S. W. Vance. Oct 81, 94p DOE/ET/14746-2
Contract AC01-80ET14746
Portions of document are illegible.
Microfiche only after original copies are exhausted.

Progress accomplished during the quarter ending September 1981 is reported. The pace of the level-of-effort in the coal liquefaction area has been accelerated to provide the technical support for the H-Coal program requested by DOE. This is a shift in technical emphasis from SRC-II to H-Coal brought about by changes within DOE and their mission causing redirection of many programs. Section 5.0 contains the progress reports for ERT's support of the H-Coal program. Considerable groundwork has been accomplished towards establishing a generic model for coal conversion processes that relates the environmental, health, and safety impacts with the processing conditions. Gasifier operating parameters (section 1.0) have been identified and criteria have been established for determining steady-state operating conditions (section 2.0). A generic discharge inventory system (section 3.0) has been developed for coal conversion processes. An operational data base management system (section 4.0) will become available next quarter with a first cut at the planning tool. Some difficulties have been encountered in the experimental program (section 6.0) that have resulted in delays in gathering data, notably, heater element failures in the reactor and sampling system. Under separate cover a topical report has been submitted that summarizes the state-of-the-art for controlling off-gases anticipated from coal conversion processes that contain sulfur species. (ERA citation 07:045659)

DE82012130 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Basis for Radiation Protection of the Nuclear Worker.
F. A. Guevara. 1982, 22p LA-UR-82-744, CONF-820427-1
Contract W-7405-ENG-36
Mexican-American Engineering Society national symposium on engineering, Houston, TX, USA, 11 Apr 1982.

A description is given of the standards for protection of persons who work in areas that have a potential for radiation exposure. A review is given of the units of radiation exposure and dose equivalent and of the value of the maximum permissible dose limits for occupational exposure. Federal Regulations and Regulatory Guides for radiation protection are discussed. Average occupational equivalent doses experienced in several operations typical of the United States Nuclear Industry are presented and shown to be significantly lower than the maximum permissible. The concept of maintaining radiation doses to As-Low-As-Reasonably-Achievable is discussed and the practice of imposing engineering and administrative controls to provide effective radiation protection for the nuclear worker is described.

DE82012521 PC **A06**/MF **A01**
Lawrence Livermore National Lab., CA.
Safety Assessment Document for the Dynamic Test Complex (Building 836).
B. N. Odell, and H. E. Pfeifer. 24 Nov 81, 104p
UCID-19343
Contract W-7405-ENG-48
Portions of document are illegible.
Microfiche only after original copies are exhausted.

A safety assessment was performed to determine if potential accidents at the 836 Complex at Site 300 could present undue hazards to the general public, personnel at Site 300, or have an adverse effect on the environment. The credible accidents that might have an effect on these facilities or have off-site consequences were considered. These were earthquake, extreme wind (including missiles), lightning, flood, criticality, high explosive (H) detonation that disperses uranium and beryllium, spontaneous oxidation of plutonium, explosions due to finely divided particles, and a fire.

PB82-872045 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Industrial Hygiene. 1974-August, 1982 (Citations from the Management Contents Data Base).
Rept. for 1974-Aug 82.
Aug 82, 89p
Supersedes PB81-863615.

This bibliography contains citations concerning industrial hygiene. Topics include laws and regulations, human health and safety, and effects of health hazards and pollution in industrial environments. Industrial skin care products, cleaning materials, and equipment are also considered. (This updated bibliography contains 122 citations, 60 of which are new entries to the previous edition.)

6L. Medical and Hospital Equipment

PB82-252875 PC **A03**/MF **A01**
Indian Standards Institution, New Delhi.
Conference on Standardization of Surgical Instruments and Medical Equipment held at Jullundur on 30-31 October 1980.
Technical papers,
Oct 80, 39p
Portions of this document are not fully legible.

The various topics covered are: Standardization and Implementation of Indian Standards on Surgical Instruments and Medical Equipment; Need to Develop Surgical Instruments by Industry; Problems of Surgical Instruments Industry vis-a-vis Implementation of Indian Standards; Instruments and Implants in Orthopedic Surgery; Need for Quality Dental Instruments; General Surgical Instruments Used by Surgeons; Design and Standardization of Wheel Chairs; Standardization of Diagnostic Instruments and Implementation; Standardization of Eye Surgery Instruments; and Medical Equipment in operation theatres.

PB82-254038 PC **A06**/MF **A01**
Cedars-Sinai Medical Center, Los Angeles, CA.
Sorbents for Application in the Treatment of ESRD Patients.
Annual progress rept. 1 Jan-31 Dec 81,
Andrew J. Lewin, and Morton H. Maxwell. 22 Jun 82, 114p
Contract NO1-AM-9-2215
See also PB82-165861.

In order to determine the optimum combination of peritoneal dialysis parameters, clinical studies were performed on ESRD patients maintained by CAPD measuring the effects of residual volume, stroke volume, dialysate flow rate, patient activity and dialysate temperature on uremic solute clearance. The average dialysate flow rate is the major determinant of clearance. Patient activity and stroke volume are also important, whereas residual volume, outflow rate, and dialysate temperature did not cause significant changes. A peritoneal dialysis machine for sorbent continuous peritoneal dialysis for overnight use has been designed. This will deliver an inflow rate of 200 ml/min, zero dwell time and an outflow rate of 40 ml/min. The average flow rate will be 33 ml/min. For a wearable sorbent peritoneal artificial kidney, it appears that the device should incorporate an inflow rate of approximately 100 ml/min and an outflow rate of approximately 18 ml/min. This would permit the use of smaller sorbent cartridges and filters while maximizing clearance.

PB82-873571 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Lasers in Medicine. 1970-August, 1982 (Citations from the NTIS Data Base).
Rept. for 1970-Aug 82.
Aug 82, 109p
Supersedes PB82-854951.

This bibliography contains citations concerning the use of lasers in biology and medicine. Laser applications, including monitoring and sensing of biological function, sterilization, coagulation, and surgery are discussed. The hazards of lasers to cells and particularly to the eyes are discussed. (This updated bibliography contains 87 citations, 19 of which are new entries to the previous edition.)

PB82-873613 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Polymeric Prosthetic Devices. 1973-August, 1982 (Citations from the Rubber and Plastics Research Association Data Base).
Rept. for 1973-Aug 82.
Aug 82, 111p
Supersedes PB81-881898.

This bibliography contains citations concerning properties and compositions of synthetic materials utilized for prosthetics in medical technology. Among the elastomers and polymers examined are methyl methacrylate, silicone rubber, polyurethane, polycarbonate, thermoplastic hydrocarbon and polyolefin, epoxy resin, polysulphone and polyvinyl chloride. Various applications and performance evaluations of polymeric prostheses are included. (This updated bibliography contains 128 citations, 47 of which are new entries to the previous edition.)

PB82-873662 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Nuclear Magnetic Resonance: Applications in Medical Diagnosis. 1977-August, 1982 (Citations from the International Information Service for the Physics and Engineering Communities Data Base).
Rept. for 1977-Aug 82.
Aug 82, 62p

This bibliography contains citations concerning the principles and diagnostic potential of nuclear magnetic resonance (NMR) imaging. Spin-lattice and spin-spin proton relaxation times in normal and diseased tissues are discussed. NMR of nuclei other than protons are also examined. Safety aspects are considered. (Contains 53 citations fully indexed and including a title list.)

6M. Microbiology:

AD-A117 376/4 PC **A02**/MF **A01**
Defence Research Establishment Suffield, Ralston (Alberta).
Development of Plaque Assay Systems for Poliovirus.
Memorandum rept.,
R. E. Fulton, and Krista Munroe. Apr 82, 18p Rept no. DRES-MEMO-1067

To properly evaluate the efficiency of the LVAS (Large Volume Air Samples) for virus collection, the development of a simple, reliable and efficient virus assay technique is required. To date, the plaque assay offers the most economical and reliable method for quantitation of infectious virus. The usefulness of a plaque assay for quantitation of airborne viruses is dependent upon the suitability of a particular host biological system for isolation of a specific virus. Since host cells vary in their susceptibility to viruses, optimal conditions for host-cell-virus interaction must be ascertained for each type of virus to be collected and assayed. The vaccine strain of poliovirus type 1 (Sabin) was chosen as a suitable test virus for initial evaluation of the efficiency and sensitivity of the LVAS for collection of viruses. This virus was chosen because it grows well in cell culture, its quantitation by plaque assay has been previously documented and it is a relatively safe virus with which to work. This report describes and compares two plaque assay techniques.

AD-A117 475/4 PC **A02**/MF **A01**
Walter Reed Army Inst. of Research, Washington, DC.
Isolation of Hepatitis A Virus from the New World Owl Monkey: A New Animal Model for Hepatitis A Infections.
Conference paper,
Stanley M. Lemon, James Leduc, and Leonard N. Binn. 18 Jun 82, 14p
Paper from the Proceedings of the Army Sciences Conference (1982), 15-18 Jun 82.

Hepatitis A virus infections occured in naturally exposed Aotus trivirgatus. Monkeys newly admitted to the Aotus colony in Panama became infected during the quarantine period, shed hepatitis A virus in feces, and had viral antigen demonstrable in the liver. Infected monkeys developed a serologic response to the virus, including transient IgM anti-HAV. Experimental infection of colony-bred Aotus monkeys with PA-33 strain hepatitis A virus confirmed the field observations of hepatitis A infections in Aotus. Viral shedding was followed by chemical evidence of hepatocellular damage, and histologic changes in the liver were similar to viral hepatitis in man. These studies clearly define the Aotus as a useful and accurate model of human hepatitis A infections. Two strains of hepatitis A virus (PA-21 and PA-33) were isolated from Aotus in cell cultures suitable for use in human vaccine production. The titer of virus yields achieved in cellular extracts approached or exceeded those required for production of inactivated picornavirus vaccines. Preparation of a tissue culture-derived, inactivated hepatitis A vaccine is now a feasible goal.

AD-A117 634/6 Not available NTIS
Wright State Univ., Dayton, OH.
Cyclic AMP and Cyclic GMP Control of Synthesis of Constitutive Enzymes in Escherichia Coli,
Peter H. Calcott. 5 May 81, 9p ARO-15525.18-LS
Grant DAAG29-78-G-0084
Distribution Jnl. of General Microbiology, v128 p705-712 1982 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A117 638/7 PC **A02**/MF **A01**
Naval Medical Research Unit No. 2, Manila (Philippines).
Rapid Carbohydrate Utilization Test to Identify Corynebacterium diphtheriae.
Technical rept.,
Robert C. Rockhill, Hilda Hadiputranto, 1981, 6p Rept no. NAMRU-2-TR-903
Pub. in Southeast Asian Jnl. of Tropical Medicine and Public Health, v12 n2 p145-147 Jun 81.

No abstract available.

AD-A117 675/9 PC **A02**/MF **A01**
Naval Medical Research Unit No. 2, Manila (Philippines).
Semiquantitative Catalase Reaction to Differentiate Neisseria gonorrhoeae from N. meningitidis, N. lactamica and N. subflava.
Technical rept.,
R. C. Rockhill, M. Lesmana, and B. Leksana. 1981, 6p Rept no. NAMRU-2-TR-899
Pub. in Southeast Asian Jnl. of Tropical Medicine and Public Health, v12 n2 p166-168 1981.

No abstract available.

AD-A117 708/8 PC **A02**/MF **A01**
Naval Medical Research Unit No. 2, Manila (Philippines).
A New Coconut Water-Tellurite-Egg Medium (CTEM) to Culture Corynebacterium Diphtheriae.
Technical rept.,
Robert C. Rockhill, Virginia Basaca-Sevilla, 1981, 6p Rept no. NAMRU-2-TR-900
Pub. in Philippines Jnl. of Microbiology and Infectious Diseases, v10 n1 p21-24 1981. Presented at the 3rd Annual Convention of the PSMID, Nov 80, Manila.

No abstract available.

AD-A117 730/2 PC **A06**/MF **A01**
Trinity Univ., San Antonio, TX.
Genetic Analysis of the Nature of Genes Coding Early Enzymes in the Metabolism of Cresol in JPT3-4, a Derivative Strain of Pseudomonas Aeroginosis J1.
Final rept. 1979-1981,
Howell D. Cobb, Jr., John W. Egan, Jr., and William E. Olive. 29 Apr 82, 109p AFOSR-TR-82-0615
Contract F49620-79-C-0192
Presented at the 1982 Meeting of the American Society for Microbiologists.

A pseudomonas strain, JPT3-4, was developed which was competent on all three cresol isomers (para, ortho, and meta). This organism maintained a transmissable FP type plasmid which could transfer the genes required to metabolize cresol to cresol incompetent strains of related species. The transfer of these plasmids was visualized via gel electrophoresis and the metabolic activity of the recipient strains was followed through the use of an oxygen electrode and spectrophotometric analysis of their metabolites. (Author)

AD-A117 831/8 PC **A02**/MF **A01**
Naval Medical Research Unit No. 2, Manila (Philippines).
Evaluation of Nutrient Agar Bile Salts Medium to Selectively Culture Vibrio Cholorae.
Technical rept.,
Robert C. Rockhill, and Virginia Basaca-Sevilla. 1981, 5p Rept no. NAMRU-2-TR-904
Pub. in Philippine Jnl. Microbiology and Infectious Diseases v10 n1 p18-20 1981.

No abstract available.

PB82-254392 PC **E05**/MF **E05**
Commission of the European Communities, Luxembourg.
Photoenergy Conversion in Artificial Systems.
Final rept.,
O. T. G. Jones, N. G. Holmes, and D. Sadler. c1981, 100p EUR-7509-EN
Customers in the European Community countries should apply to the Office for Official Publications of the European Communities, B.P. 1003, Luxembourg.

The problems encountered in the construction of photovoltaic or photogalvanic solar energy converters make the study of natural photosynthesis attractive, since components prepared from natural photosystems, i.e. from photosynthetic bacteria, could be used in the construction of photovoltaic cells; the separation of light harvesting (antenna) pigment-protein complexes from that source is relatively trouble-free. The efficiency with which reaction centers and light harvesting pigments can be incorporated into such membranes in vitro have been examined as well as some of the properties of a natural precursor particle, carrying photosynthetic pigment but not yet incorporated into the photosynthetic membrane. Such studies lead to the conclusion that pre-mixing of reaction centers and antenna pigments before reconstitution into membranes will lead to increased efficiency.

6O. Pharmacology

AD-A117 391/3 PC **A05**/MF **A01**
State Univ. of New York at Albany. Research Foundation.
Assessment of Neurological Effects of Drugs on Oculomotor and Visual Function in the Primate.
Final rept.,
E. Gregory Keating. 28 Feb 82, 93p
Contract DAAK11-79-C-0027

The primary purpose of the project reported here was to develop a test for monkeys that captured the visual, oculomotor, and cognitive capabilities analogous to those required of field personnel engaged in searching for hidden targets. The result was the Visual Search test described below. This report details the experiments which measured the effects of several cholinospecific agents (atropine, benactyzine, TMB4, physostigmine and TAB) on the visual and oculomotor competence of rhesus monkeys engaged in visual search.

AD-A117 417/6 PC **A02**/MF **A01**
Walter Reed Army Inst. of Research, Washington, DC.
Susceptibility of Clinically Sensitive and Resistant Leishmania to Pentavalent Antimony in vitro,
Jonathan D. Berman, Jeffrey D. Chulay, Larry D. Hendricks, and Charles N. Oster. 1982, 9p
Pub. in American Jnl. of Tropical Medicine and Hygiene, v31 n3 p459-465 1982.

No abstract available.

AD-A117 473/9 PC **A02**/MF **A01**
Army Inst. of Dental Research, Washington, DC.
Controlled Release of Antibiotics from Biodegradable Microcapsules for Wound Infection Control.
Conference paper,
Jean A. Setterstrom, Thomas R. Tice, Danny H. Lewis, and William E. Meyers. 18 Jun 82, 12p
Paper from the Proceedings of the Army Sciences Conference (1982), 15-18 Jun 82.

It is the goal of this study to develop microcapsules that slowly release effective therapeutic doses of antibiotics in a wound over a 14-day period, by which time microcapsules will have been biodegraded. It is the purpose of this paper to report the in vivo results obtained using recently formulated prototype microcapsules. All initial efforts in the development of the controlled antibiotic release system have used ampicillin

with lactide/glycolide copolymer as the drug vehicle. This copolymer is ideally suited for in vivo drug release since it elicits a minimal inflammatory response, is biologically compatible, and degrades under physiologic conditions. The degradation products are nontoxic and readily metabolized. All microcapsules currently formulated exist as free-flowing microspheres (<250 microns in diameter) consisting of ampicillin anhydrate coated with a poly (DL-lactide-co-glycolide) excipient having a lactide:glycolide ratio of 68:32. Microcapsules of this size can be adminstered directly to a wound by a shaker-type dispenser or aerosol spray. The rate of biodegradation is controllable because it is related to the molar ratios of the constituent polymers and to the surface area of the microcapsules.

AD-A117 480/4 PC **A02**/MF **A01**
Walter Reed Army Inst. of Research, Washington, DC.
Naloxone or TRH Fails to Improve Neurologic Deficits in Gerbil Models of 'Stroke',
John W. Holaday, and Robert J. D'Amato. 13 May 82, 10p
Pub. in Life Sciences, v31 n4 p385-392 1982.

No abstract available.

AD-A117 499/4 PC **A02**/MF **A01**
Walter Reed Army Inst. of Research, Washington, DC.
In Vitro Effects of Mycophenolic Acid and Allopurinol against Leishmania tropica in Human Macrophages,
Jonathan D. Berman, and H. Kyle Webster. 14 Dec 81, 7p
Pub. in Antimicrobial Agents and Chemotherapy, v21 n6 p887-891 Jun 82.

No abstract available.

AD-A117 623/9 PC **A02**/MF **A01**
Naval Medical Research Unit No. 2, Manila (Philippines).
Susceptibility of Campylobacter fetus Subsp. Jejuni, Isolated from Patients in Jakarta, Indonesia to Ten Antimicrobial Agents.
Technical rept.,
Signe Ringertz, Robert C. Rockhill, and Olof Ringertz. 16 Jun 81, 7p Rept no. NAMRU-2-TR-895
Pub. in Jnl. of Antimicrobial Chemotherapy v8 p333-336 1981.

No abstract available.

AD-A117 798/9 PC **A02**/MF **A01**
Naval Medical Research Unit No. 2, Manila (Philippines).
Effect of Treatment with Diethylcarbamazine on Immune Responses to Filarial Antigens in Patients Infected with Brugia malayi.
Technical rept.,
Willy F. Piessens, S. Ratiwayanto, Patricia W. Piessens, S. Tuti, and P. B. McGreevy. 1981, 12p Rept no. NAMRU-2-TR-910
Pub. in Acta Tropica, v38 p227-234 1981.

No abstract available.

AD-A117 824/3 PC **A02**/MF **A01**
Walter Reed Army Inst. of Research, Washington, DC.
Disposition of the Diastereoisomer of Mefloquine in Mice,
Ho Chung, Vernon R. Jimmerson, Robert S. Rozman, and James E. Sanders. 7 Oct 81, 9p Rept no. CONTRIB-1500
Pub. in Pharmacology, v24 p267-274 1982.

No abstract available.

PB82-248014 Not available NTIS
Salk Inst., San Diego, CA. Arthur Vining Davis Center for Behavioral Neurobiology.
Hyperactivity and Hypoactivity Produced by Lesions to the Mesolimbic Dopamine System.
Journal article,
George F. Koob, Luis Stinus, and Michel Le Moal. c1981, 21p EPA-600/J-81-579
Grant EPA-R-806777
Pub. in Behavioral Brain Research 3, p341-359 1981.

Spontaneous locomotor activity and the locomotor response to amphetamine and apomorphine were studied in rats subjected to either radiofrequency(RF), 6-hydroxydopamine (6-OHDA) of both RF and 6-OHDA lesions of the mesolimbic dopamine (DA) system. Large 6-OHDA lesions of the ventral tegmental area (VTA) or of the nucleus accumbens (N.Acc) produced hypo-activity in the open field, a complete blockade of the locomotor stimulating effects of D-amphetamine, and a profound supersensitive response to apomorphine as measured by a significant increase in locomotor activity as compared to sham-operated animals.

PB82-249301 Not available NTIS
Health Effects Research Lab., Research Triangle Park, NC.
Influence of Ozone on Pentobarbital-Induced Sleeping Time in Mice, Rats, and Hamsters.
Journal article,
Judith A. Graham, Daniel B. Menzel, Frederick J. Miller, Joseph W. Illing, and Donald E. Gardner. c1981, 12p EPA-600/J-81-247
Pub. in Toxicology and Applied Pharmacology 61, p64-73 1981.

Prior studies have shown that ozone (O3) increases pentobarbital (PEN)-induced sleeping time (S.T.) in female mice, rats, and hamsters. To investigate some potential mechanisms producing these effects, the authors measured zoxazolamine-induced paralysis time and thiopental- and hexobarbital-induced S.T., all of which were prolonged significantly in mice following a 5-hr exposure to 1960 micrograms O3/cu m (1 ppm).

6P. Physiology

AD-A117 523/1 PC **A02**/MF **A01**
School of Aerospace Medicine, Brooks AFB, TX.
Noninvasive Measurement of Human Right Intraventricular Blood Velocity by an Ultrasonic Technique,
Robert M. Olson, Edward L. Fitzpatrick, and Ewald Koegel. 20 Jul 81, 11p Rept no. SAM-TR-81-297
Pub. in the American Jnl. of Cardiology, v49 p1711-1718 May 82.

No abstract available.

AD-A117 693/2 PC **A02**/MF **A01**
Materials Research Labs., Ascot Vale (Australia).
Two Novel Methods for the Preparation of Erythrocyte Stroma Free from Haemoglobin Compared to the Conventional Centrifugation Technique.
Technical note,
H. D. Crone, M. Poretski, and M. P. Bladen. Nov 81, 11p Rept no. MRL-TN-458

The removal of haemoglobin from haemolysed erythrocyte stroma by washing over a membrane filter or by passage through a column of porous gel was compared to the removal achieved by washing in the centrifuge. The column method was preferable for an initial rapid clean-up, which could be followed by a further pass through the column, or by centrifugation to concentrate the suspension. Membrane filtration was useful when total recovery of a small sample of storma was required.

AD-A117 754/2 PC **A03**/MF **A01**
Ohio State Univ. Research Foundation, Columbus.
The Electrophysiologic Mechanisms of Halogenated Alkane Arrhythmogenesis.
Annual rept. 1 Sep 80-31 Aug 81,
S. Mark Strauch. 28 May 82, 32p AFOSR-TR-82-0591
Contract F49620-79-C-0185

Bromochlorodifluoromethane (1211) has been shown to sensitize the myocardium to the arrhythmogenic effects of various adrenergic amines. The effects of certain physiologic and pharmacologic interventions were tested, including stretching of the tissue fiber, alpha adrenergic interations, cyclic adenosine monophosphate interactions and beta blockade of slow ion channel stimulation. Other studies indicate that 1211 has no apparent direct arrhythmogenic action on the dog heart, but acts only to sensitize the heart to adrenergic amines. Present studies indicate that 1211, like beta adrenergic amines, elevates cellular cyclic adenosine monophosphate levels which, through second messenger action, contributes to the alterations in cardiac membrane properties produced by these agents. (Author)

AD-A117 840/9 PC **A02**/MF **A01**
California Univ., Los Angeles. Mental Retardation Research Center.
Pressure Microinjection for the Purpose of Cell Identification and Subsequent Ultramicroscopic Analysis,
Charles D. Woody, Charles E. Ribak, Masaki Sakai, Hiroko Sakai, and Barbara Swartz. 1981, 24p
AFOSR-TR-82-0613
Grant AFOSR-76-3074
Pub. in Current Trends in Morphological Techniques, ch7 p219-240.

No abstract available.

AD-A117 856/5 PC **A02**/MF **A01**
School of Aerospace Medicine, Brooks AFB, TX.
Application of Digital Filters in the Processing of Eye Movement Data.
Technical rept.,
Edward J. Engelken, Kennith W. Stevens, and James W. Wolfe. 25 Nov 81, 8p SAM-TR-81-300
Pub. in Behavior Research Methods and Instrumentation, v14 n3 p314-319 1982.

No abstract available.

PB82-252776 PC **A04**/MF **A01**
Groningen Rijksuniversiteit (Netherlands). Dept. of Developmental Neurology.
Neurobiology of Development, European Brain and Behavior Society Workshop Held at Groningen, Netherlands on 25-27 March 1982.
1982, 60p

Contents: The matching of central structures with the periphery (sensory and motor); Neural activity as an epigenetic shaping factor; Discontinuity and regression as a crucial phenomenon in normal development of brain and behavior; Timing of the developmental course and the problem of retardation; Onset of prenatal behavior in the human fetus and preterm infant.

6R. Radiobiology

AD-A117 429/1 PC **A02**/MF **A01**
Letterman Army Inst. of Research, Presidio of San Francisco, CA.
Laser Flash Effects: A Non-Visual Phenomenon.
Conference paper,
David I. Randolph, Elmar T. Schmeisser, and Edwin S. Beatrice. 18 Jun 82, 11p
Paper from the Proceedings of the Army Sciences Conference (1982), 15-18 Jun 82.

The 20 nsec Q-switched ruby laser exposures centered on the fovea produced no immediate changes in the grating visual evoked potential for 50 and 500 micron spot sizes at two energy levels even when visible changes occurred at these sites. The findings may have been the result of the ruby laser wavelength, which was near the visual sensitivity limit of the eye, or of the single Q-switched pulse which may have occurred too quickly to produce an immediate and/or sustained change in the cortical response. The observed delayed effects and subsequent apparent recovery of the VEP may reflect the development of edema at the laser exposure site resulting in the desynchronization of the response for a period of time. This is followed by apparent recovery which was interpreted as recruitment of the spared retinal elements with subsequent neural re-entrainment at the cortical level.

AD-A117 430/9 PC **A02**/MF **A01**
Letterman Army Inst. of Research, Presidio of San Francisco, CA.
Laser Ocular Flash Effects.
Conference paper,
H. Zwick, Kenneth R. Bloom, David J. Lund, and E. S. Beatrice. 18 Jun 82, 11p
Paper from the Proceedings of the Army Sciences Conference (1982), 15-18 Jun 82.

During this decade, lasers on the modern battlefield will become a directed energy threat to the eyes of ground force military personnel (1, 2, 3). One needs only to reflect on the enormous increase in electro-optical battlefield devices presently being developed to both train and equip troops for combat to suspect that a dramatic increase in accidental and intentional exposure incidence may well occur. Laser rangefinders (single pulse) and designators (multiple pulse) are an-

ticipated to be commonplace in the modern electronic battlefield. While the future may hold to the concept of a laser injury as radiation that 'vaporizes' its target, now we need only to be concerned with those devices that disrupt the complex man-machine interface by ocular injury. Such interfaces are critical to a modern equipped Army, and ocular injury will severely affect this complexity. Laser devices that inflict such ocular damage are easily available and will be prolific in ground battlefield scenarios. The present investigation was designed to incorporate several key features of the military scenario in order to address the question of a low level laser threat to the eye and acute vision.

AD-A117 483/8 PC **A02**/MF **A01**
Letterman Army Inst. of Research, Presidio of San Francisco, CA.
Autoradiography of Primate Retina after Q-Switched Ruby Laser Radiation.
Conference paper,
Steven T. Schuschereba, and Edwin S. Beatrice. 18 Jun 82, 15p
Paper from the Proceedings of the Army Sciences Conference (1982), 15-18 Jun 82.

Biological implications in the use of laser devices by the Army has been the subject of study in the last two decades. A principal concern of laser bioeffects investigations has been mechanism and recovery processes of retinal tissue after damage by laser radiation near the visible damage threshold. The work objectives of this study were: (1) to evaluate the recovery of Rhesus monkey retinal rods (similar in retinal structure to the human) after exposure (20 nsec pulse duration, 1000 micrometers beam spot-size) to a range of Q-switched ruby laser radiation (suprathreshold to subthreshold for retinal damage as evidenced by ophthalmoscopy); (2) to correlate morphologic damage by both light and electron microscopy with biochemical abnormalities observed by autoradiography, (3) to assess the degree of sensitivity provided by autoradiography and (4) to postulate possible damage and recovery processes.

AD-A117 484/6 PC **A02**/MF **A01**
Letterman Army Inst. of Research, Presidio of San Francisco, CA.
Ocular Effects of Relatively 'Eye Safe' Lasers.
Conference paper,
Bruce E. Stuck, David J. Lund, and Edwin S. Beatrice. 18 Jun 82, 13p
Paper from the Proceedings of the Army Sciences Conference (1982), 15-18 Jun 82.

Laser devices are an important part of current and future Army systems. Laser rangefinders, designators, communicators, and training devices are currently deployed or are in some stage of development. Most current laser rangefinders and designators, which enhance the effectiveness of the modern Army weapon systems, operate in the visible and near infrared region of the electromagnetic spectrum. The eye is particularly vulnerable in this wavelength region. The collimated laser radiation collected by the eye is transmitted by the ocular media with little attenuation and focused to a small spot on the sensory retina. The retinal irradiance is several orders of magnitude greater than that incident on the cornea; therefore, the total intraocular energy required to produce a retinal lesion is small. Lasers with output characteristic similar to those being fielded are capable of producing serious retinal injury at ranges that are tactically significant (1). The use of binoculars or magnifying optics increases the range at which these injuries can occur. Such devices cannot be used in training exercises without appropriate control restrictions or the use of protective devices. In some cases, training with the actual system in a realistic scenario is inhibited by these restrictions and troop proficiency may never be attained. (Author)

AD-A117 527/2 PC **A04**/MF **A01**
Naval Ocean Systems Center, San Diego, CA.
Mechanism of Electromagnetic Energy Effects of the Nervous System. Experimental System and Preliminary Results.
Preliminary rept. Oct 79-16 Jun 81,
N. L. Campbell, and C. L. Brandt. 1 Jul 82, 68p Rept no. NOSC-TR-698

Effects of high-level electromagnetic (EM) energy on living nerve tissue were assessed by subjecting individual nerve cells of the marine gastropod Aplysia californica to microwave radiation levels of 10-300 mW/sq cm . Of the 84 cells exposed, five showed inhibitory responses and one showed excitatory response that required from 6 to 82 minutes to develop. In each case, the cell returned to normal activity within 70 minutes of removing the EM field. It appears from the data collected that interaction of EM energy with the electrical activity of nerve cells does exist, and that this interaction is not heat-related. Understanding the mechanism of this interaction will provide a valuable tool in determining the hazards of nonionizing EM energy and the necessary safety limits of exposure. (Author)

AD-A117 810/2 PC **A02**/MF **A01**
Deputy Chief of Staff for Research, Development and Acquisition (Army), Washington, DC.
Bioeffects Data Concerning the Safe Use of GaAs Laser Training Devices.
Conference proceedings,
David J. Lund, Edwin S. Beatrice, and Steven T. Schuschereba. 18 Jun 82, 14p
Paper from the Proceedings of the Army Sciences Conference (1982), 15-18 Jun 82.

The incident energy dose for single Q-switched exposure was determined for six laser wavelengths obtained from the dye laser. The solvent for all the laser dyes was DMSO. The laser linewidth at 912 nm, was 0.4 nm. For the other wavelengths the laser linewidth was less than 0.08 nm, the resolution limit of the monochrometer used for wavelength measurements. The laser beam was nearly gaussian in profile. The beam divergence was measured at the diameter where the intensity fell to 1/e times the peak value. Retinal tissue from two eyes exposd to 900 nm radiation was processed and sectioned for light microscopy. It is shown that, although the damage to the retinal pigment epithelium is slight, the photoreceptors at the exposure site have been damaged throughout their length. A lesion is near the edge of the macula where both rods and cones are found. The RPE is more extensively damaged in this lesion, and again the photoreceptors are damaged throughout their length.

DE82013350 PC **A05**/MF **A01**
Oak Ridge National Lab., TN.
Biological Effects of Static Magnetic Fields: A Selective Review with Emphasis on Risk Assessment.
C. E. Easterly. Apr 82, 78p ORNL/TM-7860
Contract W-7405-ENG-26

Rather than focusing on literature per se, the current study determines the status of magnetic field information that is applicable to risk assessment. Hence, an attempt is made to identify both the literature that is useful to the goal of risk assessment and a framework within which risk assessment methodologies can be derived. From this selected review, it is concluded that three areas exist for which adequate information can be found to begin modelling: disease induction, reproduction and development, and cardiovascular response. The first two are supported by a combination of positive and negative findings and the last by a calculational technique which utilizes the physically well-known principle of flow retardation for a conducting fluid moving through a magnetic field. (ERA citation 07:048110)

DE82780329 MF **A01**
Radiobiologisch Inst. TNO, Rijswijk (Netherlands).
REP Annual Report 1980.
1981, 301p INIS-mf-6804
U.S. Sales Only. Available in microfiche only.

Items within the scope of EDB have been entered individually into the data base. (ERA citation 07:048185)

DE82780330 MF **A01**
Amsterdam Univ. (Netherlands).
Response of Growing Bones to Irradiation. Experimental and Clinical Studies.
D. Gonzalez Gonzalez. 11 Dec 80, 197p INIS-mf-6812
Thesis.
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

This thesis describes the effects of ionizing radiations on growing bones. The epiphyseal disc of growing mouse tibia was selected as a model for the experiments. An attempt has been made to obtain clinical data from irradiated bones during the childhood and to quantitate this information. Within the range of possibilities correlations have been established between the experimental and clinical data. (Atomindex citation 13:647673)

N82-27708/8 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Develop Real-Time Dosimetry Concepts and Instrumentation for Long Term Missions.
Technical Progress Report, Feb. 1981 - Feb. 1982.
L. A. Braby. May 82, 20p NASA-CR-167606, NAS 1.26:167606
NASA ORDER T-794H, Contract DE-AC06-76RL-01830

The development of a rugged portable instrument to evaluate dose and dose equivalent is described. A tissue-equivalent proportional counter simulating a 2 micrometer spherical tissue volume was operated satisfactorily for over a year. The basic elements of the electronic system were designed and tested. And finally, the most suitable mathematical technique for evaluating dose equivalent with a portable instrument was selected. Design and fabrication of a portable prototype, based on the previously tested circuits, is underway.

PB82-873704 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Nonionizing Electromagnetic Radiation: Biological Effects. 1970-August, 1982 (Citations from the Engineering Index Data Base).
Rept. for 1970-Aug 82.
Aug 82, 97p

This bibliography contains citations concerning the biological effects of non-ionizing electromagnetic radiation (EMR). Radio frequency ignition hazards and radiation hazards are discussed. Measurement methods and instrumentation used to measure and evaluate EMR are considered. Safety standards are also discussed. (Contains 102 citations fully indexed and including a title list.)

PB82-873712 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Nonionizing Electromagnetic Radiation: Biological Effects. 1972-August, 1982 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1972-Aug 82.
Aug 82, 195p
Prepared in cooperation with the National Aeronautics and Space Administration, Washington, DC.

This bibliography contains citations concerning the biological effects of non-ionizing electromagnetic radiation. Energy absorption and radiation effects to humans, animals and insects are discussed. Theoretical and experimental dosimetry are considered, and safety standards are included. (Contains 194 citations fully indexed and including a title list.)

6S. Stress Physiology

AD-A117 420/0 PC **A02**/MF **A01**
Boston Univ., MA.
Cardiovascular and Perceptual Responses to Isometric Exercise,
Leslie I. Goldberg, D. Joyce White, and Kent B. Pandolf. 28 May 81, 6p
Pub. in Archives of Physical Medicine and Rehabilitation, v63 p211-216 May 82.

No abstract available.

AD-A117 432/5 PC **A02**/MF **A01**
Army Research Inst. of Environmental Medicine, Natick, MA.
Aerobic Power and Coronary Risk Factors in 40 and over Aged Military Personnel.
Conference paper,
John F. Patton, James A. Vogel, Julius Bedynek, Donald Alexander, and Ronald Albright. 18 Jun 82, 15p
Paper from the Proceedings of the Army Sciences Conference (1982), 15-18 Jun 82.

The past few years have seen considerable attention given to the assessment of aerobic fitness and the quantification of aerobic training programs in young (less than 35 years of age) Army personnel (3,15). Physical training and fitness, however, have largely been ignored for the 40 and over age group. Until re-

cently, such personnel for the most part did not have a specific fitness program and were not required to meet any minimum fitness standard. In October 1980, the Chief of Staff, US Army, initiated a new physical training program which emphasizes the development and maintenance of cardiorespiratory fitness through aerobic training for all age groups (17-60 years) on active duty. The goal of this program is for individuals aged 40 and over to achieve sufficient aerobic fitness during a 6-month training period to meet an age-adjusted standard for the two-mile run. Since potential health risks of both physical training and testing are greater in personnel over the age of forty, the Army physical fitness program includes a mandatory medical and cardiac screen in order to try to predict and prevent untoward cardiovascular events. The screening procedure, which the Surgeon General has proposed to take place at the time of the biannual physical exam for personnel aged 40 and over, consists of a coronary risk factor assessment as developed by the Framingham Heart Study (9).

AD-A117 462/2 PC **A04**/MF **A01**
Institute of Human Performance, Langley Park, MD.
Physical Performance Tasks Required of U.S. Marines Operating in a High Altitude Cold Weather Environment.
Final rept.,
Paul O. Davis, Arthur V. Curtis, and Thomas L. Bachinski. 23 Jul 82, 61p
Contract N00014-80-C-0473

Ten representatives of the Institute of Human Performance were integrated into a marine battalion during a high altitude cold weather training operation for the purpose of gathering descriptive and objective information about the types of physical performance tasks encountered by marine infantryment (MOS 0311). Through the use of minicassette recorders, scales, cameras and other data collection equipment, scenarios were described which typify the critical, frequent and strenuous types of tasks indigenous to marines in this environment. Distances covered on foot, loads carried, rates of travel and grades encountered were detailed and described, as well as other environmental overlays which impact on troop performance. Sustained marches, under varified atmospheric conditions, weighted with awkward personal protective equipment approaching 70% of one's body weight, was identified as the overriding physical task in this environment. Unpacked snow, and grades of 10-15 were routinely encountered. An ability to maintain a line of march for periods of four to six hours were not uncommon. The arduous nature of this task was confounded by frequent falling into deep snow while wearing snow shoes and having to reestablish an upright position.

AD-A117 648/6 PC **A02**/MF **A01**
Royal Naval Personnel Research Committee, London (England).
A Trimix Saturation Dive to 660 Metres: Studies of Cognitive Performance, Mood and Sleep Quality,
Robert H. Logie, and Alan D. Baddeley. Mar 82, 24p RNP-2/82, DRIC-BR-83533

This paper reports psychological observations on men during a simulated (pressure chamber) dive to 660 msw using a gas mixture known as Trimix (He-O2-N2). Recent studies have suggested that this mixture allows for faster compression with less impairment in performance than the mixture traditionally used (He-O2). Data were obtained from two divers on tests of cognitive performance, namely arithmetic ability, grammatical reasoning, perceptual speed, visuo-spatial manipulation and semantic processing. At maximum depth there was a severe blanket impairment of ability to perform any of the tests. However at shallower depths, the impairments were not as marked, with performance at 300 msw close to that measured at surface pressure. Subjects were also required to fill in two questionnaires, one concerned with the quality of their previous night's sleep, the other with their mood at the time. Sleep quality was disrupted throughout the 'dive', with one subject affected rather more than the other. Mood patterns varied less systematically, with large individual differences. Low correlations between sleep quality and performance indicate that performance decrements were due almost entirely to breathing Trimix at high pressure.

AD-A117 800/3 PC **A02**/MF **A01**
Naval Submarine Medical Research Lab., Groton, CT.
Performance Effects with Repeated Exposure to the Diving Environment,
George Moeller, Craig Chattin, William Rogers, Kevin Laxar, and Bernard Ryack. 11 Sep 80, 12p Rept no. NSMRL-922
Pub. in Jnl. of Applied Psychology, v66 n4 p502-510 1981.

No abstract available.

AD-A117 864/9 PC **A03**/MF **A01**
Army Research Inst. of Environmental Medicine, Natick, MA.
Effectiveness of Ice (Water) Packets Vests in Reducing Heat Stress.
Technical rept.,
George F. Fonseca. Mar 82, 44p Rept no. USARIEM-T-3/82

The auxiliary cooling provided over the torso area by each of two similar ice (water) packets vests was directly measured on a life-sized sectional manikin. These vests were worn with a combat vehicle crewman (CVC) ensemble plus a complete chemical protective (CW) suit. Cooling rates provided (watts) versus time were determined for a completely wet (maximal sweating) skin condition during heat exposure to three hot environments. The number of ice packets attached to a vest varied from 43 to 91 ice packets. When approximately 50% of the torso surface area is covered by ice packets, each additional ice packet added to the vest increases the torso cooling to a greater degree than an ice packet added to a vest with less than 50% torso surface area coverage. Interface temperature between two ice packets and the torso surface and the temperature changes inside one ice packet during and experiment, were also measured. (Author)

AD-A117 921/7 PC **A02**/MF **A01**
Civil Engineering Lab. (Navy), Port Hueneme, CA.
Biodynamic Data Bank Feasibility Study.
Technical rept.,
Carley C. Ward. Jun 82, 24p AFAMRL-TR-82-39
Contract MIPR-F007624-79-0007

The report presents an investigation into the feasibility of establishing a biodynamic data base at Air Force Aerospace Medical Laboratory. The original objective of this study was to assess the feasibility of a biodynamic data bank at AMRL. Potential problems were to be analyzed, and recommendations made regarding the basic design and indexing scheme. Considering the overwhelming need for organization and storage of the data, and the available digital data mangement techniques, a biodynamic data bank is definitely feasible. It is the various data bank options which need to be carefully considered. In this document AMRL's data base requirements are examined. The procedure and programs which will satisfy these requirements are recommended for implementation. (Author)

N82-27963/9 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
The Evaluation of Studies of Flight Personnel of the German Lufthansa on the Question of Stress During Flights on the Short European Routes.
K. E. Klein, H. Bruener, P. Kuklinski, S. Ruff, and H. M. Wegmann. Feb 82, 39p NASA-TM-76660, NAS 1.15:76660
Contract NASW-3541
Transl. Into English from German Report Rept-Dlr-355-74/2 Dfvlr, Oberpfaffenhofen, (Germany, F.R.). 1972 34 p. Original Language Document Announced as N77-80915. Transl. By Kanner (Leo) Associates, Redwood City, Calif.

Medical studies were undertaken on the stress experience by the cockpit crew working the short routes in Europe and a special attempt was made to discover whether signs of a summation of stress due to flight work become visible during a circuit of several days. For this purpose the pulse and respiratory rates were determined for 22 crew members as an indication of the acute stress occurring during the flight and the amount of stress hormone in the urine as an indication of the extent of total stress in an extended study period.

6T. Toxicology

AD-A117 453/1 PC **A02**/MF **A01**
Army Environmental Hygiene Agency, Aberdeen Proving Ground, MD.
Topical Hazard Evaluation Program of Candidate Insect Repellents, US Department of Agriculture Proprietary Chemicals.
Final rept. Feb 81-Apr 82,
Michael J. Topper, and John G. Harvey, Jr. 16 Jul 82, 12p USAEHA-75-51-0291-82, USAEHA-75-51-0293-82, USAEHA-75-51-0297-82, USAEHA-75-51-0304-82

Preliminary hazard evaluations of AI3-38266, 38270a, 38272a, 38293a, 38296a, and 38193 were performed by means of laboratory animal studies using rats, rabbits, and guinea pigs. Chemicals AI3-38266, 38270a, 38272a, 38293a, and 38299a caused mild skin irritation while AI3-38193 caused no skin irritation. Chemicals 38270a, 38272a, 38299a and 38193 produced mild corneal injury and in addition, AI3-38299a and 38193 produced injury to the conjunctiva of rabbits. Washing of the eyes reduced the severity of the injuries. Chemicals AI3-38266, 38293a and 38296a were noninjurious to the eyes.

AD-A117 474/7 PC **A02**/MF **A01**
Walter Reed Army Inst. of Research, Washington, DC.
Studies on Butyrylcholinesterase Inhibitors.
Conference paper,
Alan D. Wolfe, Clarence E. Emery, Jeff S. Verdier, and Dorothy A. Prichard. 18 Jun 82, 14p
Paper from the Proceedings of the Army Sciences Conference (1982), 15-18 Jun 82.

The ultimate object of the present studies is the elucidation of the structure, function, and physiological significance of the enzyme, butyryl-cholinesterase (BuChE, E.C.3.1.1.8). It occurs in the blood, tissues, ganglia and cytosol of organisms and cells (1,2,3), and its structure (4), substrate, and inhibitor patterns resemble those of acety/cholinesterase (AChE). Both enzymes possess many inhibitors in common, including organo-phosphate (OP) threat agents, but preferential inhibition of either enzyme frequently occurs. Among the compounds which preferentially suppress BuChE in comparison with AChE are those which exert significant neurophar-macological effects, for example, the phenothiazines, tropates, phencyclidines, butyrophenones, imipramines, and curariforms (1,5,6,7,8,9). Phenothiazines, butyrophenones and imipramines are tranquillizers, tropates are spasmodics, and phencyclidines are hallucinogens. BuChE inhibition relative to the pharmacologic or toxic influence of such drugs and threat agents is unknown, despite the overt medical importance these compounds possess. In addition, they possess unusual military significance, since phenothiazines and atropine, in particular, are frequently included in OP antidotal formulations (10,11). (Author)

AD-A117 477/0 PC **A02**/MF **A01**
Walter Reed Army Inst. of Research, Washington, DC.
Purification and Biological Characterization of Shiga Toxin from Shigella dysenteriae 1,
J. Edward Brown, Darrell E. Griffin, Sara W. Rothman, and B. P. Doctor. 14 Dec 81, 12p
Pub. in Infection and Immunity, v36 n3 p996-1005 Jun 82.

No abstract available.

AD-A117 501/7 PC **A02**/MF **A01**
Army Environmental Hygiene Agency, Aberdeen Proving Ground, MD.
Topical Hazard Evaluation Program of Candidate Insect Repellents AI3-38326a and AI3-38348a, US Department of Agriculture Proprietary Chemicals.
Final rept. Apr 81-Apr 82,
Michael J. Topper. 16 Jul 82, 10p Rept nos. USAEHA-75-51-0313-82, USAEHA-75-51-0327-82

Preliminary hazard evaluations of AI3-38326a and AI3-38348a were performed by means of laboratory animal studies using New Zealand White rabbits and Sprague-Dawley rats. The technical grade chemicals caused moderate injury to the cornea and in addition, produced some injury to the conjuctiva. They did not cause any skin irritation. Chemical AI3-38326a was relatively nontoxic by ingestion while AI3-38348a was moderately toxic. Based upon the eye results, it was recommended that both chemicals not be approved

for further testing as candidate insect repellents. If any of these chemicals provide a significant improvement of pest repellent properties over currently available chemicals, it is suggested that they be purified through activated charcoal and resubmitted in their projected use formulation. (Author)

AD-A117 642/9 PC **A02**/MF **A01**
Army Environmental Hygiene Agency, Aberdeen Proving Ground, MD.
Migration of 14C Permethrin from Impregnated Military Fabric.
Interim rept. Dec 81-Feb 82,
Hubert L. Snodgrass, Jr. 16 Jul 82, 11p Rept no. USAEHA-75-51-0351-82

The insecticide Permethrin was assessed for potential fallout onto the skin surface from impregnated military fabric. Radiolabeled (14C) Permethrin was used for the fabric impregnation. After 7 days of continuous wear by rabbits, about 5 percent of the available chemical reached the skin surface, about 8 percent after 3 weeks. The deposition level when extrapolated to man would not be expected to cause toxic effects. (Author)

AD-A117 727/8 PC **A03**/MF **A01**
Brigham Young Univ., Provo, UT. Dept. of Microbiology.
Effect of Chemical Mutagens on Herpes Virus-induced Cellular Transformation and Testing for Mutagenesis in Mouse Cells.
Final scientific rept. 1 Jun 79-31 May 82,
F. Brent Johnson. Jun 82, 41p AFOSR-TR-82-0579
Grant AFOSR-80-0209

Assays which detect quantitative increases of morphological transformation in 3T3 cells were employed to detect transformation by seven temperature sensitive (ts) mutants of herpes simplex type 2 virus (HSV-2). It was determined that all seven mutants caused transformation at the non-permissive temperature. Mutant A8 (293) caused formation of the most foci and appeared to be a more sensitive indicator of transformation in comparative experiments (31 foci per million cells compared to four foci per million cells for ultraviolet-irradiated wild type virus). (Author)

DE82011438 MF **A01**
Oak Ridge National Lab., TN.
Studies on the Mechanisms Involved in Multistage Carcinogenesis in Mouse Skin.
T. J. Slaga, S. M. Fischer, C. E. Weeks, A. J. P. Klein-Szanto, and J. Reiners. 1981, 55p CONF-810350-2
Contract W-7405-ENG-26
ICN-UCLA symposium on molecular and cellular biology, Keystone, CO, USSR, 15 Mar 1981, Portions of document are illegible.
Available in microfiche only.

This report summarizes some important data which relates to the multistage nature of skin carcinogenesis. Topical application of some chemical carcinogens will induce skin tumors on mice. In general, most chemical carcinogens have to be given repetitively in order to induce a large number of tumors (complete carcinogenesis). Alternatively, skin tumors can be induced by the sequential application of a single sub-threshold dose of a carcinogen (initiation phase) followed by the repetitive treatment with a noncarcinogenic promoter (promotion phase). This second procedure employing initiation and promotion is referred to as two-stage carcinogenesis. The report provides evidence that an important aspect of tumor initiation by polycyclic aromatic hydrocarbons (PAH) is their metabolism to an electrophilic inermediate(s) which covalently interacts with epidermal DNA; provides evidence for the multistage nature of skin tumor promotion; correlates promotion associated morphological and biochemical responses with specific stages of promotion; and compares data on complete and two-stage carcinogenesis in various stocks and strains of mice in order to determine if tumor initiation and/or promotion is responsible for their varying sensitivities to skin cancer induction. (ERA citation 07:048224)

DE82012280 PC **A04**/MF **A01**
Cincinnati Univ., OH. Coll. of Medicine.
Exploratory Research on Mutagenic Activity of Coal-Related Materials. Final Report, June 1, 1980-November 30, 1981.
D. Warshawsky, and R. S. Schoeny. 1981, 122p
DOE/ET/00222-9
Contract AC22-78ET00222
Portions of document are illegible.
Microfiche only after original copies are exhausted.

Samples ETTM-05, ETTM-12, ETTM-18, ETTM-19, ETTM-20, ETTM-21, and ETTM-22 were tested for mutagenicity in Salmonella strains TA1535, TA1537, TA1538, TA98 and TA100. None of the samples tested were mutagenic when Aroclor 1254-induced S9 was not incorporated into the test system. Samples ETTM-05 and ETTM-12 (powdered coal) have been found to be marginally mutagenic. Organic solvent fractions prepared from these have also been shown to be slightly mutagenic. ETTM-18 was found to be mutagenic for strains TA1537, TA1538, TA98 and TA100 when assayed with Aroclor-induced S9. A highly active methylene chloride component was noted upon fractionation of ETTM-18. ETTM-19, ETTM-20, and ETTM-22 were all marginally mutagenic. ETTM-21 was apparently not mutagenic. The greatest difficulty in the evaluation of data from in vitro assays is in the extrapolation to the human situation. Although in two studies, approximately 90% of known carcinogens were mutagenic for Salmonella, sufficient correlative data do not exist to suggest that a positive response in this assay predicts carcinogenicity or a potential mutagenic hazard for humans. This, however, does not detract from its applicability as a screen for identifying agents for further study. As a screen this assay offers several advantages: it has been used in more comparative studies than other microbial tests; it is less expensive and easier to undertake than the mammalian cell transformation assays which offer a high degree of positive response/known carcinogen correlation; results are obtained in 24 to 48 hours; and results are more simple and less time consuming to score than with chromosome aberration or sister chromatid exchange. (ERA citation 07:042253)

DE82012327 PC **A04**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Studies on Toxicity of OTEC Plant Components on Eucalanus SP. From the Gulf of Mexico. Annual Report, October 1980-September 1981.
A. Venkataramiah, G. J. Lakshmi, C. Best, G. Gunter, and E. Hartwig. Oct 81, 61p LBL-13916
Contract W-7405-ENG-48
Microfiche only after original copies are exhausted.

These bioassays were undertaken as a part of the environmental impact studies of the pollutants from the Ocean Thermal Energy Conversion (OTEC) plants. Ammonia and chlorine were selected as toxicants. Eucalanus pileatus and E. elongatus were used as experimental animals because of their importance in the food cycle of the commercial fisheries. A considerable amount of time was devoted to become familiar with the culturing procedures of the Eucalanus sp. and to adapt those procedures to laboratory needs. Algae cultures were developed with Rhizosolenia alata and Thalassiosira fluviatilis for use as food for the copepods. Collection and maintenance techniques for E. pileatus and E. elongatus were developed. Culturing operations were successful through the F sub 1 generation for E. pileatus. A mini-flow-through seawater bioassay system was designed and built for these studies. The system can also be used for running the bioassays with small organisms, embryos and larvae of fish, etc. In the chronic exposure the survival rates in the sublethal concentrations did not change significantly from the acute ammonia and chlorine bioassays. However, in the incipient lethal concentrations of ammonia and chlorine the survival rates decreased gradually. It was concluded that oceanic species like sargassum shrimp (Latreutes fucorum), filefish (Monocanthus hispidus) and copepods Eucalanus sp. were apparently more sensitive to toxicants than the mullet (Mugil cephalus) collected in inshore waters. Within the same species the tolerance to toxicity increased significantly with increasing size (age). Among the oceanic forms, sargassum shrimp appeared to be the hardiest of all species with filefish being most sensitive to ammonia. In chlorine sargassum shrimp exhibited a much greater tolerance toward ammonia than the copepods. The tolerance limits of small mullet (0.3 and 0.4g), which evidently were fresh arrivals from offshore, responded similarly to both toxicants as sargassum shrimp. (ERA citation 07:044723)

N82-27964/7 PC **A07**/MF **A01**
Tennessee Univ. Center for the Health Sciences, Memphis. Materials Science Toxicology Labs.
Toxicity of Thermal Degradation Products of Spacecraft Materials.
Final Report, 10 Nov. 1980 - 9 May 1982.
W. H. Lawrence, W. H. Lawrence, J. E. Turner, C. Sanford, and S. Foster. 7 May 82, 138p NASA-CR-167615, NAS 1.26:167615
Contract NAS9-15670

Three polymeric materials were evaluated for relative toxicity of their pyrolysis products to rats by inhalation: Y-7683 (LS 200), Y-7684 (Vonar 3 on Fiberglass), and Y-7685 (Vonar 3 on N W Polyester). Criteria employed for assessing relative toxicity were (1) lethality from in-chamber pyrolysis, (2) lethality from an outside-of-chamber pyrolysis MSTL Procedure, and (3) disruption of trained rats' shock-avoidance performance during sub-lethal exposures to in-chamber pyrolysis of the materials.

PB82-248048 PC **A02**/MF **A01**
Health Effects Research Lab., Research Triangle Park, NC.
Dose Response of Elastase-Induced Emphysema in Hamsters.
Journal article,
James A. Raub, Robert R. Mercer, Frederick J. Miller, Judith A. Graham, and John J. O'Neil. 26 Oct 81, 6p EPA-600/J-81-332
Pub. in American Review of Respiratory Diseases 125, p432-435 1982.

Elastase-induced emhysema in hamsters was studied using pulmonary function tests in an effort to develop techniques for determining the effects of air pollutants on the progression of this disease. It appears that as little as 6 units of elastase produces mild emphysema in hamsters, which is detectable by pulmonary function testing. Of the tests, the DLCO and N2 slope were the most effective in detecting the degree of impairment.

PB82-249293 PC **A02**/MF **A01**
Health Effects Research Lab., Research Triangle Park, NC.
Effect of Benomyl on Reproduction in the Male Rat.
Journal article,
Susan D. Carter, and John W. Laskey. 4 Nov 81, 10p EPA-600/J-81-258
Pub. in Toxicology Letters 11, p87-94 1982.

Adult Sprague-Dawley male rats (65 days of age) received 10 daily treatments of 0, 200 or 400 mg benomyl/kg/day by gavage. Body weight, tissue weights, total epididymal sperm counts and sperm concentration from the vas deferens were measured 14 days after the last treatment. Testicular histology was evaluated in the 0 and 400 mg/kg/day groups. Significant findings included 35-48% depressions in the total epididymal sperm counts and in the vas deferens sperm concentrations in adult animals treated with 200 or 400 mg/kg/day. Histological evaluations of testicular sections from 6 adult animals in the 400 mg/kg/day group indicated a slight to moderately severe hypospermatocytogenesis in 2 animals and a slight to severe generalized hypospermatogenesis in 2 animals. Caudal epididymis weights were significantly (P less than 0.05) depressed with benomyl treatment. No treatment effects were found in body weight, liver, kidney, tests, or seminal vesicle weights.

PB82-249319 PC **A02**/MF **A01**
Health Effects Research Lab., Research Triangle Park, NC.
Species Susceptibility to Delayed Toxic Neuropathy in Relation to In vivo Inhibition of Neurotoxic Esterase by Neurotoxic Organophosphorus Esters.
Journal article,
Salah A. Soliman, Ralph Linder, Jackie Farmer, and August Curley. 30 Jun 81, 11p EPA-600/J-81-238
Pub. in Jnl. of Toxicology and Environmental Health 9, p189-197 1982.

Tri-o-cresyl phosphate (TOCP) and O-ethyl O-(4-cyanophenyl) phenylphosphonothioate (cyanofenphos, Surecide) were found to be delayed neurotoxicants. The results suggest that the differences between chickens and mice in susceptibility to neurotoxic organophosphates may be attributed to (1) inhibitor specificity of NTE forms in the brain in these two different animal species and/or (2) inability of the active metabolites of these neurotoxic compounds to reach the site of action.

PB82-873647 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.

Toxicity of Selenium. 1976-August, 1982 (Citations from the Energy Data Base).
Rept. for 1976-Aug 82.
Aug 82, 189p
Supersedes PB82-854241.Prepared in cooperation with the Department of Energy, Washington, DC.

This bibliography contains citations concerning the toxicity, carinogenicity, environmental pollution, and other hazards and adverse effects of selenium. The detection, characterizaton, analytical methods, and removal from the environment are discussed. Pollution from coal fired and geothermal power plants are considered. (This updated bibliography contains 148 citations, 51 of which are new entries to the previous edition.)

PB82-873654 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Toxicity of Selenium. 1970-August, 1982 (Citations from the NTIS Data Base).
Rept. for 1970-Aug 82.
Aug 82, 150p
Supersedes PB82-854233.

This bibliography contains citations concerning the toxicity, carcinogenicity, environmental pollution, and other hazards and adverse effects of selenium. These aspects of selenium are dealt with in relation to aquatic and terrestrial flora and fauna, including man. (This updated bibliography contains 92 citations, 16 of which are new entries to the previous edition.)

PB82-873878 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Toxicity of Fibers. 1970-August, 1982 (Citations from the NTIS Data Base).
Rept. for 1970-Aug 82.
Aug 82, 329p
Supersedes PB82-855578.

This bibliography contains citations concerning the toxicity of occupational exposures to fibers and composite materials. Topics include respiratory illnesses due to chronic exposure to asbestos and glass fibers, and methods and equipment for control of airborne fibers. (This updated bibliography contains 243 citations, 49 of which are new entries to the previous edition.)

7. CHEMISTRY

7A. Chemical Engineering

AD-A117 738/5 Not available NTIS
Wisconsin Univ.-Madison. Dept. of Chemical Engineering.
The Bifurcation behavior of Tubular Reactors,
Klavs F. Jensen, and W. Harmon Ray. 17 Nov 80, 24p ARO-16415.93-MA
Contract DAAG29-80-C-0041
See also AD-A099 360.
Availability: Pub. in Chemical Engineering Science, v37 n2 p199-222 1982 (No copies furnished by DTIC/NTIS).

No abstract available.

DE82001780 MF **A01**
Foster-Miller Associates, Inc., Waltham, MA.
Coal-Materials Handling: Coal-Feeder Development. Phase I. Fourth Quarterly Technical Progress Report, July-September 1981.
14 Oct 81, 17p DOE/MC/14601-T5
Contract AC21-80MC14601
Portions of document are illegible.
Available in microfiche only.

The objective of this program is to demonstrate extended operating capabilities of the Linear Pocket Feeder (LPF). In order to accomplish this, extensive modification of both the LPF and the facility were required. The necessary modifications are now substantially complete, except for the installation of selected components, and the program is in a start-up and debugging mode. A host of problems associated with equipment design, improper fabrication, mismatch of components, and general equipment malfunction have increased the time required for start-up and delayed testing. To date, preliminary testing of coarse coal has been conducted, with some problems requiring correction before extensive testing can begin. Preliminary testing of pulverized coal with the new equipment has been initiated. (ERA citation 07:042039)

DE82008323 MF **A01**
Catalytic, Inc., Wilsonville, AL.
1980 Operation of SRC Pilot Plant, Wilsonville, Alabama. Annual Report, January-December 1980.
Feb 82, 198p EPRI-AP-2235
Contract AC22-76ET10154
Portions of this report are illegible.
Best available copy from document source. Available in microfiche only.

This report summarizes the operating conditions and test results obtained during 1980 at the six ton per day solvent refined coal (SRC-I) pilot plant in Wilsonville, Alabama. The plant was in operation for the equivalent of 247 days, an on-stream factor of 67.7%. Kentucky 9 coals from the Lafayette, Dotiki and Fies mines were processed. During 1980, the operating conditions and equipment were adjusted to evaluate potential process improvements. These experiments produced significant results in the following areas: Operating V103 High Pressure Separator in the hot mode; varying T102 Vacuum Column operating temperature; adding light SRC (LSRC), a product of the third stage of the Critical Solvent Deashing (CSD) unit, to the process solvent; investigating the effects of the chlorine content of the feed coal on corrosion in the process vessels; evaluating the effects of adding sodium carbonate on corrosion rates; operating under conditions of low severity, i.e., low reactor temperature and long residence time; and testing an alternate CSD deashing solvent. A series of simulation runs investigating the design operating conditions for a planned 6000 ton per day SRC-I demonstration plant were also completed. Numerous improvements were made in the CSD processing area, and the components for a hydrotreating unit were installed.

DE82009596 MF **A01**
Transco Energy Co., Houston, TX.
Transco Medium-Btu Coal Gasification Project: Feasibility Study. Final Report.
Mar 82, 573p DOE/RA/50381-1156-V.2
Contract FG01-81RA50381
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

The economic analysis of the project estimated a minimum constant real cost of MBG of $6.30/MMBtu (1981-$CIF). The most likely competitive fuels for the MBG at HL and P's Robinson Plant are natural gas and low sulfur No. 6 fuel oil. Most forecasters now expect that deregulated gas prices existing by the time this plant could be producing MBG, 1989, will be priced competitively with low sulfur No. 6 fuel oil on a heating value basis at the burner tip. For this reason, the comparison presented here is based on 1981 prices paid for low sulfur (0.7%) No. 6 fuel oil on the Gulf Coast. Average spot prices are used to remove distortions from old contracts. The average of the 1981 spot prices published in Platt's Oilgram for 0.7% sulfur No. 6 fuel oil in the Gulf Coast market was $5.13/MMBtu. Ignoring both the small unit costs for fuel oil transportation to the Robinson Plant and the burner modifications required to use MBG, the MBG cost is 23% above the fuel oil average in 1981. With the MBG cost held constant in real terms, a 2.6% average real growth rate in fuel oil price would be required to make the two fuels equal in price by 1989. Two key benefits the MBG can offer versus competitive fuels to enhance its marketability are shelter from potentially large real increases in competing fuel prices and security of supply. HL and P's willingness to commit to purchase the MBG will largely hinge on the value placed on these benefits. (ERA citation 07:042075)

DE82009931 PC **A08**/MF **A01**
Catalytic, Inc., Wilsonville, AL.
SRC-I Solvent-Refined-Coal Process. Operation of the Solvent-Refined-Coal Pilot Plant, Wilsonville, Alabama. Quarterly Technical Progress Report, April-June 1981.
Mar 82, 171p DOE/ET/10154-96
Contract AC22-76ET10154
Portions of document are illegible.

This report summarizes the operating conditions and test results obtained during the second quarter of 1981 at the six ton per day solvent refined coal (SRC-I) pilot plant in Wilsonville, Alabama. The plant operated for approximately 81% of the period. Kentucky 9 coal from the Fies mine was processed in all runs. The following potential process improvements and tests were evaluated: in the SRC unit - operation of the new, reduced volume and residence time V103 High Pressure Separator, dissolver temperature and pressure variation studies, evaluation of the hot separator mode of operation, and evaluation of SRC unit reaction section conditions for two-stage liquefaction; in the CSD unit - steam stripping of SRC and LSRC to reduce product-related DAS losses, evaluation of the heated screw and rotary air lock on the continuous ash discharge vessel, equilibrium studies in the first stage, and evaluation of the CSD unit performance at increased feed rates; and in the Hydrotreater unit - collection of operating data for preliminary evaluations of the HTR unit performance.

DE82009994 PC **A16**/MF **A01**
Zenz (Frederick A.), Inc., Garrison, NY.
State-of-the-Art Review and Report on Critical Aspects and Scale-Up Considerations in the Design of Fluidized-Bed Reactors. Final Report on Phase 1.
1980, 353p DOE/MC/14141-1158
Contract AC21-80MC14141
Portions of document are illegible.
Microfiche only after original copies are exhausted.

Information is given on the design of distributor plates and opening geometry to provide uniform flow over the reactor area. The design of granular bed filters is also considered. Pressure drops and particle size in the bed are discussed. (ERA citation 07:044338)

DE82011893 MF **A01**
Hydrocarbon Research, Inc., Lawrenceville, NJ.
Laboratory Program to Support H-Coal Pilot-Plant Operations. Volume III. PDU Run 9: Appendices B and C.
Feb 82, 96p DOE/ET/10152-T12-V.3, FE-2547-50-Vol.3
Contract AC05-77ET10152
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

No abstract available.

DE82012040 MF **A01**
Ebasco Services, Inc., New York.
Supplemental Studies for Anthracite Coal Gasification to Produce Fuels and Chemicals: NEPGAS Project.
24 Aug 81, 191p DOE/RA/20221-T1-V.2
Contract FG01-79RA20221
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

Volume 2 contains: (1) comparative evaluations of several coal gasification processes (Westinghouse, Saarberg/Otto, KGN/PVC, Lurgi, Koppers-Totzek, Texaco, Shell-Koppers, BGC Slagging Lurgi, KT/KBW); (2) site conditions, coal sources and characteristics, recommendations for tests with the coal and gasifier selected, and evaluation of other engineering and environmental uncertainties; (3) continuation and update of environmental assessment and information needed for licensing application; (4) commercialization including market assessment, raw material supplies, water requirements, socio-economic factors, recommended plant capacity, economics and financial incentives needed, etc.

DE82013555 PC **A23**/MF **A01**
Pittsburg and Midway Coal Mining Co., Englewood, CO.
Solvent-Refined-Coal (SRC) Process. Volume II. Sections V-XIV. Final Report.
May 82, 537p DOE/ET/10104-46-V.2
Contract AC05-76ET10104

Microfiche only after original copies are exhausted.

This report documents the completion of development work on the Solvent Refined Coal Process by The Pittsburgh and Midway Coal Mining Co. The work was initiated in 1966 under Office of Coal Research, US Department of Interior, Contract No. 14-01-0001-496 and completed under US Department of Energy Contract No. DE-AC05-79ET10104. This report discusses work leading to the development of the SRC-I and SRC-II processes, construction of the Fort Lewis Pilot Plant for the successful development of these processes, and results from the operation of this pilot plant. Process design data generated on a 1 ton-per-day Process Development Unit, bench-scale units and through numerous research projects in support of the design of major demonstration plants are also discussed in summary form and fully referenced in this report. (ERA citation 07:048987)

DE82901863 PC **A02**/MF **A01**
Conoco Coal Development Co., Library, PA. Research Div.
Agglomeration of SRC Residues. Final Report.
F. W. Theodore, and G. E. Wasson. Jan 82, 24p
EPRI-AP-2236
Portions of document are illegible.

EPRI contracted with CCDC to agglomerate Kerr-McGee ash concentrate and determine whether the agglomerates could be used as a fixed-bed gasifier feed. Briquettes were produced from Kerr-McGee ash concentrate which met CCDC's strength criteria for handling as feed to a fixed-bed gasifier. In addition, when shock heated under conditions simulating gasifier conditions, strong coke was produced demonstrating that the briquettes will not disintegrate during the initial temperature shock when charged to the gasifier. The conclusion of this study is that briquettes produced from the Kerr-McGee ash concentrate studied could be considered as feed for a fixed-bed gasifier. The CO sub 2 -carbon reactivity of the briquettes had values between a typical eastern and western coal. In the case of a dry bottom gasifier where the reactivity is important, it is not clear-cut whether the ash concentrate briquettes would be an economical feed. A closer inspection by a gasifier manufacturer is needed to resolve this issue. Since higher gasification temperatures are used in a slagging gasifier, the reactivity question is eliminated and the briquettes should be considered as a feed. This study does not deal with the exact design of a gasifier since this is a function of the type used. The gasifier manufacturer should be considered in future work for their input on critical design considerations i.e. stirrer design, etc. (ERA citation 07:042079)

PAT-APPL-6-285 194 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Pasadena, CA. Pasadena Office.
Autocatalytic Coal Liquefaction Process.
Patent Application,
S. A. Qader. Filed 3 Jan 80, 32p N82-25394/9,
NASA-CASE-NPO-14876-2
Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An improved process for liquefying coal in which coal minerals at high content are utilized as hydrocracking catalysts id described. A slurry of 10 to 60% by weight of coal in a recycled liquefied coal product containing 15 to 30% by weight of coal minerals is pressurized with excess hydrogen to a pressure of 2,000 to 4,000 psi and heated to a temperature of 450 to 550 degrees C. The coal minerals autocatalytically convert coal solids to a low viscosity liquid product and to a gas product in high yields while reducing oxygen, nitrogen, and sulfur content of the coal product as compared to other coal liquefaction processes under development.

PB82-233933 PC **A02**/MF **A01**
Sentralinstitutt for Industriell Forskning, Oslo (Norway).
Naturgass som Rastoff for Petrokjemisk Industri en Oversikt over Akteuelle Processer (Natural Gas as Raw Material for Petrochemical Industry: A Survey of Existing Processes).
Final rept.,
Elizabeth Baumann Ofstad. 1 Oct 81, 24p ISBN-82-7267-403-3, 81-03-08-1
Text in Norwegian.

Today's use of natural gas as raw material for the chemical industry is described with special emphasis on synthesis gas- and methane-based conversions. The processes are briefly outlined. Processes which today are supposed to be of future importance for utilization of the natural gas resources, have been looked into in more detail.

PB82-253170 PC **A16**/MF **A01**
Superior Harbor Commission, WI.
Feasibility Study Report for the City of Superior Ethanol Refinery: A Refinery Utilizing Grain Dust and Whole Grain to Produce Fuel Grade Ethyl Alcohol.
Apr 82, 352p EDA-82-0042
Grant EDA-06-06-01847-40

The City of Superior Power Alcohol Refinery Study performed by Ultrasystems examines the entire range of elements that would contribute to the success of the proposed Project. The engineering design and cost characteristics of the plant itself were determined for the three representative plant outputs of 1.53 million, and 15.3 million gallons per year. The availability and pricing of the feedstock for the plant was analyzed, as was market demand for the ethanol product and animal feed co-product from the plant. The environmental considerations associated with such a facility, and the permit requirements for the Project have been examined. And finally, the profitability of the Project at the three representative outputs, has been projected. The results of these analyses is contained in this report.

PB82-253527 PC **A09**/MF **A01**
National Bureau of Standards, Washington, DC.
NBS and Industrial Biotechnology: Technical Developments and Future Measurement Needs.
Planning rept. no. 12,
Thomas C. O'Brien. Jul 82, 180p NBSIR-82-2549

Biotechnology will be a significant industrial technology in the future. NBS's role with respect to this technology is examined; and infrastructure support requirements needed by future biotechnology based industries are identified in this report. This report also describes steps NBS could take to meet future industry infrastructure support needs in biotechnology by: examining commodity organic chemical industry trends; identifying R&D opportunities and barriers to commercialization of biotechnology products; and evaluating current NBS capabilities in relation to long-term industry needs. Report conclusions indicate that: (a) the commodity organic chemical industry will undergo structural changes in the next two decades; (b) early applications of biotechnology will be in higher value added products; (c) 'traditional' commodity chemicals synthesized from petroleum feedstocks will be difficult to displace via biotechnological process; (d) biotechnology offers significant opportunities for production of 'non-traditional' commodity organic chemicals; (e) biomass may become an important feedstock for production of organic chemicals; and (f) existing NBS capabilities could meet many of industry long-term infrastructure support needs in biotechnology. This report provides a framework for possible short- and long-term actions NBS could take to meet industry needs in biotechnology. Report includes an extensive bibliography.

PB82-255167 PC **A03**/MF **A01**
Imhausen-Chemie G.m.b.H., Lahr (Germany, F.R.).
Optimizing the Combination of a Fischer-Tropsch Synthesis with Coal Hydrogenation for the Production of Motor Fuels,
Karl-Heinz Imhausen, Norbert Heger, Karl-Heinz Eisenlohr, Friedrich Schnur, and Franz Stratz. Aug 82, 34p BMFT-FB-T-80-048
Trans. of mono. Optimierung der Kombination einer Fischer-Tropsch-Synthese mit einer Kohlehydrierung zum Zwecke der Produktion von Motorkraftstoffen, n.n., 26 Jul 82, by F. H. H. Valentin.

The objective of the optimization study has been to find the most favorable combination of coal hydrogenation, synthesis gas production and Fischer-Tropsch synthesis for the production of (spark ignition and diesel) motor fuels and liquefied gas from lignite and from bituminous coal with or without the simultaneous production of mains gas. It was found that, for lignite, high pressure hydrogenation had the lowest capital cost of all the processes investigated, yielded motor fuels conforming to specifications and had a high thermal efficiency. For bituminous coal only a combination of high pressure hydrogenation and Fischer-Tropsch synthesis led to specification products. In both cases a combined production of motor fuels, liquefied gas and mains gas could be economically attractive if a market for mains gas exists or can be developed and if the net financial return for the mains gas covers the production costs.

7B. Inorganic Chemistry

N82-27331/9 PC **A06**/MF **A01**
Systematics General Corp., Sterling, VA.
Communications Satellite Systems Capacity Analysis.
Final Report.
L. Browne, T. Hines, and B. Tunstall. Jun 82, 114p
NASA-CR-167911, NAS 1.26:167911
Contract NAS3-22888

Analog and digital modulation techniques are compared with regard to efficient use of the geostationary orbit by communications satellites. Included is the definition of the baseline systems (both space and ground segments), determination of interference susceptibility, calculation of orbit spacing, and evaluation of relative costs. It is assumed that voice or TV is communicated at 14/11 GHz using either FM or QPSK modulation. Both the Fixed-Satellite Service and the Broadcasting-Satellite Service are considered. For most of the cases examined the digital approach requires a satellite spacing less than or equal to that required by the analog approach.

7C. Organic Chemistry

AD-A117 478/8 PC **A02**/MF **A01**
University of Southern California, Los Angeles. Dept. of Chemistry.
Reaction of Secondary and Tertiary Alkyllithium Reagents with Vinyl Di- and Trisiloxanes. Synthesis of alpha-Silyl Silanols,
Heinrich A. Firgo, and William P. Weber. 24 Nov 81, 5p AFOSR-TR-82-0402
Grant AFOSR-80-0006
Pub. in Organometallics, v1 n4 p649-653, 1982.

No abstract available.

AD-A117 485/3 PC **A02**/MF **A01**
Construction Engineering Research Lab. (Army), Champaign, IL.
A Method of Polymer Design and Synthesis for Selective Infrared Energy Absorption.
Conference paper,
Alvin Smith. 18 Jun 82, 15p
Paper from the Proceedings of the Army Sciences Conference (1982), 15-18 Jun 82.

The present study presents a procedural method of designing and synthesizing polymers intended to selectively absorb energy in particular bands of the infrared spectrum. Thus, filters may be prepared that can be used to mask or alter the signatures of infrared-emitting objects and, in effect, camouflage these objects against observation by attenuating or altering the infrared energy that is allowed to be transmitted to a detector. In addition to the molecular design of the polymer, a change in the physical form by foaming is studied to determine this effect on the overall efficiency of the attenuating properties of the filter. An advantage of foaming the polymer is the ability to make essentially self-supporting filter enclosures for infrared emitters. The most obvious uses of selectively absorbing infrared filters are in military camouflaging applications and as photographic filters analogous to the visible light filters commonly used.

AD-A117 739/3 PC **A02**/MF **A01**
Crystacomm, Inc., Mountain View, CA.
Investigation of Large Diameter Polycrystalline Crucible Shaped InP.
Final status rept. no. 4, 1 May 81-30 Apr 82,
George A. Antypas. Jul 82, 17p
Contract N00014-81-C-2231

Two processes are described for the synthesis of polycrystalline crucible shaped InP, vertical Bridgman and Phosphorus injection to boric oxide encapsulated Indium. While both processes appear attractive the

latter is more promising since it could potentially result in situ growth of InP. (Author)

AD-A117 819/3 Not available NTIS
Ohio State Univ., Columbus. Dept. of Chemistry.
New, Systematic Syntheses of Boron Hydrides via Hydride Ion Abstraction Reactions: Preparation of B2H6, B4H10, B5H11, and B10H14,
Mark A. Toft, J. B. Leach, Francis L. Himpsl, and Sheldon G. Shore. 20 Oct 81, 7p ARO-15611.8-CH
Grant DAAG29-78-G-0112
Availability: Pub. in Inorganic Chemistry, v21 p1952-1957 1982 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A117 866/4 PC **A02**/MF **A01**
Indiana Univ. at Bloomington. Dept. of Chemistry.
1,2-Dibenzylitetradimethylamido-Dimolybdenum and -Ditungsten (M=M) Compounds and Their Reactions with Carbon Dioxide and 1,3-Diaryltriazines. A Radical Difference.
Technical rept.,
M. J. Chetcuti, M. H. Chisholm, K. Folting, J. C. Huffman, and J. Janos. 7 Jul 82, 11p Rept no. INDU/DC/TR-82/1-MC
Contract N00014-79-C-0044

The preparation of 1,2-M2(benzyl) 2(NMe2)4 (M=M) compounds (M = Mo and W) and their reactions with each of CO2 and 1,3-diaryltriazines are described. The molybdenum and tungsten dibenzyl compounds differ in their reactivity quite markedly. For tungsten, the M=M bond is preserved in the formation of W2(benzyl)2-(NMe2)2(ArN3Ar)2 and W2(benzyl)2(O2CNMe2)4 compounds, while molybdenum favors reductive elimination and formation of M-M quadruply bonded compounds Mo2(O2CN-Me2)4 and Mo2(ArN3Ar)2, where Ar = phenyl and p-tolyl. Reductive elimination is shown to proceed via a radical pathway. (Author)

N82-27493/7 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Synthesis and Characterization of a Melt Processable Polyimide.
H. D. Burks, and T. L. St.Clair. May 82, 32p NASA-TM-84494, NAS 1.15:84494
Proposed for Presentation at the Soc. Of Plastic Engr. 1ST Tech. Conf. On Polyimides, Ellenville, N.Y., 10-12 Nov. 1982.

A melt processable polyimide which contains sulfur and oxygen bridges between the aromatic rings (BDSDA/APB) was synthesized and characterized. Its physical, mechanical, thermal and flow properties were determined as was its resistance to some of the more commonly used solvents. The melt flow properties were measured for the temperature range 250 C - 350 C and under the conditions (stress/strain) encountered in commercial processes.

PAT-APPL-6-343 810 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Nitropolyformals.
Patent Application,
Horst G. Adolph. Filed 29 Jan 82, 9p AD-D009 562/0
Availability: This Government-owed invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Nitropolyformals of the formula H(OCH2C(NO2)2ZC(NO2)2CH2OCH2(OCH2C(NO2)2ZC(NO2)2CH2)xOH wherein Z is -CH2-, -CH2CH2-, -CH2CH2CH2-, -CH2OCH2-, or -CH2NHCH2- and wherein the average molecular weight of the nitro-polyformal molecules if from about 1,000 to about 50,000. the nitropolyformals are prepared by reacting a diol of the formula HOCH2C(NO2)2ZC(NO2)2CH20H, wherein Z is defined as above, with formaldehyde in the presence of concentrated sulfuric acid. These polymers are useful as energetic binders in explosives and propellants. (Author)

PAT-APPL-6-370 235 PC **A02**/MF **A01**
Department of the Air Force, Washington, DC.
Azido Esters.
Patent Application,
Edward F. Witucki. Filed 21 Apr 82, 13p AD-D009 571/1
Portions of this document are not fully legible.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention involves the synthesis of a novel family of azido esters and their utilization as energetic plasticizers for advanced solid propellant compositions. This family includes as an illustrative member, the novel compound 6-axidohexyl-6-azidohexanoate. (Author)

7D. Physical Chemistry

AD-A117 442/4 PC **A03**/MF **A01**
Michigan State Univ., East Lansing. Dept. of Chemistry.
Structures and Fragmentation Mechanisms of the Ions of Ethanol by Triple Quadrupole Mass Spectrometry.
Interim technical rept.,
R. Kazmer Latven, Margaret B. McFarland, and Christie G. Enke. 15 Jul 82, 29p Rept no. TR-9
Contract N00014-76-C-1092

The low energy (10-25 eV) collisionally activated decomposition of the molecular ion and of some important fragment ions of ethanol, ethanol-OD, and 2,2,2-d3 ethanol has been studied by triple quadrupole mass spectrometry to obtain information regarding the ions' structures and fragmentation pathways. In this technique, ions generated by electron impact in the mass spectrometer ion source are mass selected in the first quadrupole, undergo collisionally activated decomposition (CAD) in the second, RF-only, quadrupole collision cell, and the resulting daughter ions are mass analyzed by the third quadrupole. The unit resolving power of the final quadrupole analyzer is a distinct advantage over other implementations of MS/MS in that structural information contained in deuterated species is readily obtainable. Ethanol ions thus studied include (CH3CH2OH)+, (CH3CHOH)+, (CH2COH)+, (CH2CO)+, (CH3OH)+ and (CH2OH)+. Fragmentation mechanisms based on CAD spectra are consistent with the fragmentation of a particular ion's deuterated analogs. The elucidation of the decomposition mechanism leads to an unambiquous assignment of parent ion structure in many cases. The observed dissociations parallel closely those observed in both electron impact and high energy CID in sector instruments. The data suggest that fragmentation reactions which follow electron impact and collisional activation at both high and low energies are at least qualitatively independent of the method of excitation.

AD-A117 443/2 PC **A02**/MF **A01**
Michigan State Univ., East Lansing. Dept. of Chemistry.
Determination of Carbon Monoxide in Air by Triple Quadrupole Mass Spectrometry.
Technical rept.,
R. Kazmer Latven, and Christie G. Enke. 15 Jul 82, 22p Rept no. TR-10
Contract N00014-76-C-1092

Carbon monoxide has been determined at parts-per-million concentration in the presence of carbon dioxide, nitrogen, and hydrocarbons by triple quadrupole mass spectrometry (TQMS). In this work, advantage is taken of the ability of TQMS to distinguish differing ions of the same mass. The first quadrupole mass filter selects m/z 28; these selected ions undergo collision-activated decomposition in the RF-only quadrupole collision cell and the CO+ product ion at m/z 12 is mass filtered by the third quadrupole and detected. Quantitation of the CO concentration is achieved by the addition of a known amount of labeled internal standard, 13CO, which displays a fragmentation peak at m/z 13 when the first mass filter selects the parent at m/z 29. Side-by-side comparison with the m/z 12 peak from CO allows the determination of CO concentration to within 20% down to 10 ppm. (Author)

AD-A117 502/5 PC **A03**/MF **A01**
SRI International, Menlo Park, CA.
Parameters for Ozone Photolysis as a Function of Temperature at 280-330 nm. Revision.
Final rept. Sep 78-Mar 80,
John E. Davenport. May 82, 43p FAA/EE-80-44-REV
Contract DOT-FA78WA-4263
Revision of report dated Apr 80, AD-A097 775.

This study was undertaken to obtain the parameters for ozone photolysis in the 280-330 nm region as a function of temperature in the 200-300 K range. The absolute absorption coefficients for 03 were measured at 298, 271, 225, and 206 K and were tabulated at 1-nm intervals over the 250-370 nm wavelength range. Uncertainties in the absorption coefficients range from 2% at room temperature to about 14% at 206 K and mainly fall in the 3-7% range. Pressure of 0.02-100 torr ozone were used, and no pressure effect was observed up to 800 torr N2.

AD-A117 541/3 PC **A13**/MF **A01**
Atlantic Research Corp., Alexandria, VA.
Evaluation of Solid Sorbents for Sampling and Analysis of Explosives from Water.
Final technical rept. Dec 80-Apr 82,
George L. Anspach, William E. Jones, III , and Judith F. Kitchens. Apr 82, 277p ARC-49-5028, DRXTH-TE-CR-82142
Contract DAAK11-81-C-0016

This report presents the results of a laboratory evaluation of available resins for their efficiency and reliability for sampling low levels of explosives from water for the purpose of quantitative analysis of the explosives. Thirteen different sorbents were evaluated for eight explosives. After the initial screening studies, the most effective resin for each explosive was selected. Each explosive/resin combination was subjected to precision and accuracy testing to determine the detection limit for the explosive in water and the reliability of the method. Preservation studies were also performed to determine if the explosives degraded on the resins. The data show solid sorbent sampling to be an easy and reliable method for removal and concentration of explosives from water and easily adaptable to GC to HPLC analysis for the explosives. Detection limits for all the explosives in water were less than 10 micro g/L. In general, the Porapak (R or S) resins were superior to the styrene divinylbenzene resins (e.g. XAD-4 or XAD-2) for sampling of explosies in water.

AD-A117 616/3 Not available NTIS
New York Univ., NY. Dept. of Chemistry.
Infrared Photothermal Deflection Spectroscopy of Carbon-Supported Metal Catalysts,
A. G. Severdia, M. J. D. Low, and C. Morterra. 1982, 8p ARO-16631.14-CH
Contract DAAG29-79-C-0135
Availability: Pub. in Spectroscopy Letters, v15 n5 p415-421 1982 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A117 619/7 Not available NTIS
North Carolina Univ. at Chapel Hill. Dept. of Chemistry.
Spectroscopic Characterization of Electrophilic d4 Methylene and Benzylidene Complexes of the Type Cp(CO)2(L)M CHR+ (L = PPh3, PEt3; M = Mo, W; R = H, Ph). Experimental Determination of Barriers to Rotation about the Tungsten-Methylene Multiple Bond,
Susan E. Kegley, M. Brookhart, and G. Ronald Husk. 1982, 4p ARO-18782.1-CH
Contract DAAG29-79-D-1022
Presented at the National Meeting of the American Chemical Society, Washington, DC 1981.
Availability: Pub. in Organometallics, v1 p760-762 1982 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A117 626/2 PC **A09**/MF **A01**
Columbia Radiation Lab. New York.
Research Investigation Directed Toward Extending the Useful Range of the Electromagnetic Spectrum.
Progress rept. no. 32, 1 Apr 81-31 Mar 82,
Georg W. Flynn. 31 Mar 82, 182p
Contracts DAAG29-79-C-0079, N00014-78-C-0517
Sponsored in part by Contracts F49620-82-K-0008 and DAAG29-82-K-0089 and Grants AFOSR-81-0009 and NSF-ENG78-19426.

Contents: Quantum Detection and Sensing of Radiation; Physical and Photochemical Properties of Electronic Materials; Energy Transfer and Relaxation in Small Polyatomic Molecules; Picosecond Energy Transfer and Photofragmentation Spectroscopy; Generation and Control of Radiation; and Significant Accomplishments and Technology Transition Report.

AD-A117 635/3 Not available NTIS
Duke Univ., Durham, NC.
The Stress Dependence of Adsorption,
Mikael Ciftan, and Edward Saibel. 1982, 12p ARO-17939.1-PH
Contract DAAG29-79-D-1001
Availability: Pub in Microscopic Aspects of Adhesion and Lubrication, p459-469 1982 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A117 643/7 PC **A09**/MF **A01**
Environmental Science and Engineering, Inc., Gainesville, FL.
Research and Development Services: Methods Development.
Final rept. 24 Dec 80-24 Jul 82,
J. J. Mousa, D. H. Powell, R. E. Hall, A. L. Shroads, and J. W. Johnson. 23 Jul 82, 180p 81-401-400, DRXTH-TE-CR-82165
Contract DAAK11-81-C-0018
See also Appendices AD-A117 644.

Method development was conducted to develop analytical methods for eight munition-related compounds in water and soil matrices. Single-analyte and multiple-analyte procedures were developed using GC (gas chromatography) and HPLC (high performance liquid chromatography) techniques. Precision and accuracy testing of the methods was performed in natural and standard matrices.

AD-A117 650/2 Not available NTIS
Minnesota Univ., Minneapolis. Dept. of Chemistry.
Dipole Sums on a Surface with Fractional Coverage: Application to Enhanced Raman Spectra of Halide Ions on Silver,
Henry Nichols, and Robert M. Hexter. 5 Jan 82, 5p ARO-16665.5-CH
Contract DAAG29-80-C-0017
Availability: Pub. in Jnl. of Chemical Physics, v76 n11 p5595-5598, 1 Jun 82 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A117 672/6 PC **A07**/MF **A01**
Avco-Everett Research Lab., Inc., Everett, MA.
Research on Sources of Gas Phase Metastable Atoms and Molecules.
Final technical rept. 15 Aug 79-15 Feb 82,
R. C. Slater, H. A. Hyman, D. Trainor, and A. Flusberg. May 82, 135p AFWAL-TR-82-2029
Contract F33615-79-C-2051

This study is concerned with the development of new types of sources for the production of metastable atoms and molecules. In the context of the present study, the term metastable means any excited atomic or molecular species with a relatively long radiative lifetime. Several separate tasks were undertaken under this program. The literature was searched, and a review of radiative lifetimes and radiative decay mechanisms was compiled for a representative number of atomic and molecular systems of interest to such diverse areas as gas discharge physics, chemical physics, flame chemistry and plasma physics. A second task involved a literature review of prior basic research metastable sources followed by the development and experimental testing of appropriate candidate sources for the production of rare gas atomic and molecular metastable species. Four methods for producing high fluxes of metastable atoms and molecules were investigated theoretically and modeled. Methods for the storage of metastables for times up to the radiative lifetime were also investigated. A preliminary discussion of an optical trap technique is described.

AD-A117 680/9 PC **A02**/MF **A01**
New York Univ., NY. Dept. of Chemistry.
Anomalous Reorganization Free Energies in Optical Electron Transfer in Solution.
Technical rept.,
Paul Delahay. Jun 82, 24p Rept no. TR-1

Autoionization bands are observed in the photoelectron emission spectroscopy of aqueous solutions of cyanometalate complexes (Mn, Fe, W, Mo), anions (NO(-)3, ClO(-)4) and cations (Ag(+), Tl(+)). Reorganization free energies for autoionization bands are anomalously low in absolute value (by ca. 1 eV) in comparison with direct transitions to the continuum. Interpretation is based on potential energy profiles and model calculations for the reorganization free energy.

AD-A117 725/2 PC **A02**/MF **A01**
Rutgers - The State Univ., New Brunswick, NJ. Dept. of Mathematics.
Chain Polymers,
Joel L. Lebowitz. 1980, 3p AFOSR-TR-82-0605
Grant AFOSR-78-3522
Pub. in Science, v208 p1140-1141, 6 Jun 80.

No abstract available.

AD-A117 756/7 PC **A02**/MF **A01**
Rutgers - The State Univ., New Brunswick, NJ. Dept. of Mathematics.
Statistical Mechanics of Simple Fluids: Beyond van der Waals,
Joel L. Lebowitz, and Eduardo M. Waisman. 1979, 9p AFOSR-TR-82-0593
Grant AFOSR-78-3522
Pub. in Physics Today, p1-8 Mar 80.

No abstract available.

AD-A117 757/5 PC **A02**/MF **A01**
Rochester Univ., NY. Dept. of Chemistry.
Semiclassical Approach to Spontaneous Emission of Molecular Collision Systems: A Dynamical Theory of Fluorescence Line Shapes,
Kai-Shue Lam, and Thomas F. George. 15 May 81, 20p AFOSR-TR-82-0617
Contract F49620-78-C-0005, Grant NSF-CHE80-22874
Pub. in Jnl. of Chemical Physics, v76 n7 p3396-3413, 1 Apr 82.

No abstract available.

AD-A117 768/2 PC **A02**/MF **A01**
Rochester Univ., NY. Dept. of Chemistry.
Recent Theoretical Chemical Dynamics at Rochester in the Paths of Joseph O. Hirschfelder,
Thomas F. George, I. Harold Zimmerman, Paul L. DeVries, Jian-Min Yuan, and Kai-Shue Lam. 22 Jun 81, 13p AFOSR-TR-82-0616
Grant AFOSR-82-0046
Pub. in Jnl. of Physical Chemistry, v86 n7 p1075-1086 Apr 82.

No abstract available.

AD-A117 771/6 PC **A03**/MF **A01**
Rutgers - The State Univ., New Brunswick, NJ. Dept. of Mathematics.
On the Equilibrium Theory of Fluids: An Introductory Overview,
Joel L. Lebowitz, and Eduardo M. Waisman. 1982, 31p AFOSR-TR-82-0582
Grant AFOSR-78-3522
Pub. in The Liquid State of Matter: Fluids, Simple and Complex, p1-29 1982.

No abstract available.

AD-A117 789/8 PC **A02**/MF **A01**
Rutgers - The State Univ., New Brunswick, NJ. Dept. of Mathematics.
Elastic Properties of a Polymer Chain,
Itzhak Webman, Joel L. Lebowitz, and M. H. Kalos. 16 Jul 80, 6p AFOSR-TR-82-0604
Contract DE-AC02-76ER03077, Grant AFOSR-78-3522
Pub. in Physical Review A, v23 n1 p316-320 Jan 81.

No abstract available.

AD-A117 791/4 PC **A02**/MF **A01**
Rutgers - The State Univ., New Brunswick, NJ. Dept. of Mathematics.
Excluded-Volume Expansion of Polymer Chains: A Monte Carlo Study of the Scaling Properties,
I. Webman, Joel L. Lebowitz, and M. H. Kalos. 11 Dec 79, 6p AFOSR-TR-82-0603
Contract DOE-EY-76-C-02-3077, Grant AFOSR-78-3522
Pub. in Physical Review B, v21 n12 p5540-5543, 15 Jun 80.

No abstract available.

AD-A117 792/2 PC **A02**/MF **A01**
Rutgers - The State Univ., New Brunswick, NJ. Dept. of Mathematics.
A Condition on the Derivative of the Potential in the Primitive Model of an Electric Double Layer,
Lesser Blum, Joel L. Lebowitz, and Douglas Henderson. 8 Nov 79, 3p AFOSR-TR-82-0596
Grant AFOSR-73-2430
Pub. in Jnl. of Chemical Physics, v72 n7 p4249-4250, 1 Apr 80.

No abstract available.

AD-A117 814/4 PC **A03**/MF **A01**
Cincinnati Univ., OH. Dept. of Materials Science and Metallurgical Engineering.
Structure and Properties of Polymers and Organosilanes Adsorbed Onto Oxidized Aluminum and Titanium.
Interim rept. 1 Jul 81-30 Jun 82,
F. James Boerio. 1 Jul 82, 35p
Contract N00014-80-C-0733
See also report dated 1 Jul 81, AD-A102 365.

The structure of films formed by gamma-aminopropyltriethoxysilane (gamma-APS) adsorbed onto titanium, iron, and aluminum from aqueous solutions was determined and related to the effectivess of the silane as a primer for improving the hydrothermal stability of metal-to-metal adhesive joints. In all cases gamma-APS was adsorbed as highly hydrolyzed oligomers and then condensed during drying on the metal surface to form siloxxane polymers. However, the oxidized surfaces of aluminum and, to a slight extent, iron were etched in aqueous solutions of gamma-APS at pH 10.4, resulting in the inclusion of metal ions in the adsorbed films. Some evidence for the formation of aluminosiloxane polymers during adsorption of gamma-APS onto aluminum substrates at pH 10.4 was obtained.

AD-A117 816/9 Not available NTIS
Ohio State Univ., Columbus. Dept. of Chemistry.
Neutron and X-Ray Diffraction Studies of Tris(methyldiphenyiphosphine) tetrahydroborato(1-) copper, CuP(C6H5)2CH33(BH4). The First Accurate Characterization of an Unsupported Metal-Hydrogen-Boron Bridge Bond,
F. Takusagawa, T. F. Koetzle, S. G. Shore, Alessandro Fumagalli, and T. Schmitkons. 26 Mar 81, 7p ARO-15611.2-CH
Grant DAAG29-78-G-0112
Availability: Pub. in Jnl. of the American Chemical Society, v103 n17 p5165-5171 1981 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A117 855/7 PC **A02**/MF **A01**
Pennsylvania State Univ., University Park. Dept. of Chemistry.
Multiphoton Resonance Ionization of Sputtered Neutrals: A Novel Approach to Materials Characterization.
Technical rept.,
N. Winograd, J. P. Baxter, and F. M. Kimock. 10 Mar 82, 9p
Contract N00014-80-C-0491
Pub. in Chemical Physics Letters, v88 n6 p581-584, 28 May 82.

No abstract available.

AD-A117 888/8 PC **A02**/MF **A01**
Texas Univ. at Austin. Dept. of Chemistry.
Thermal Desorption of H2 and CO on Pt/TiO2.
Technical rept.,
J. A. Schreifels, D. N. Belton, and J. M. White. Jul 82, 10p Rept no. TR-26
Contract N00014-75-C-0922

Thermal desorption of D2 from oxidized titanium surfaces, covered with various amounts of platinum, shows no detectable irreversible adsorption for up to three monolayers of Pt when the substrate temperature is 130K. Twelve monolayers of Pt give a substrate that adsorbs significant amounts of both CO and H2.

AD-A117 890/4 PC **A02**/MF **A01**
Texas Univ. at Austin. Dept. of Chemistry.
Dissociative Adsorption of CO2 on Oxidized and Reduced Pt/TiO2.
Technical rept. 1 Jan-31 Dec 82,
Katsumi Tanaka, and J. M. White. Jul 82, 11p Rept no. TR-25
Contract N00014-75-C-0922

On both oxidized and reduced Pt/TiO2, carbon dioxide decomposes at room temperature to form chemisorbed oxygen atoms and carbon monoxide. In the absence of Pt no decomposition was found. On reduced

samples, the oxygen atoms were stabilized on the titania support and reacted further with CO2 to form adsorbed bidentate carbonate. On reduced Pt/TiO2, the adsorbed CO produced in the decomposition reaction produced a linearly bound species at step sites in the initial stages of the reaction. As the reaction proceeded, CO adsorbed linearly on terrace sites was found. On oxidized Pt/TiO2, the decomposition rate was much slower and only linear step site species were observed. From the results we conclude that Pt step sites are the active sites for CO2 dissociation. (Author)

AD-A117 891/2 PC **A02**/MF **A01**
Texas Univ. at Austin. Dept. of Chemistry.
Characterization of Species Adsorbed on Oxidized and Reduced Anatase.
Technical rept. 1 Jan-1 Dec 82,
Katsumi Tanaka, and J. M. White. 23 Jul 82, 19p
Rept no. TR-24
Contract N00014-75-C-0922

The adsorption of water, pyridine carbon dioxide and carbon monoxide were studied by infrared absorption spectroscopy on reduced and oxidized anatase. There are two kinds of isolated OH groups, as well as two kinds of adsorbed water molecules, for the anatase powders used in this study. These species are assigned to adsorption on different crystal faces. The water and hydroxyl species are more stable on oxidized anatase. Some sites where OH groups are readily formed are thought to have different coordination as compared to sites where water is held. The coordination number of the Ti ions is 4 for water adsorption and 4 or 5 for OH. No surface Bronsted acidity is detected by pyridine adsorption. The surface hydroxyl groups, working as OH minus react with coordinated C02 to form carbonate species when the oxidized surfaces are exposed to C02. The resulting bicarbonate species decompose to form water molecules which, upon evacuation, dissociate to some extent so that OH groups are partially recovered. On oxidized anatase, room temperature CO exposure gave rise to some surface reduction and two different kinds of adsorbed CO were detected. (Author)

AD-A117 892/0 PC **A02**/MF **A01**
Texas Univ. at Austin. Dept. of Chemistry.
Properties of Pt Supported on Oxides of Titanium.
Technical rept.,
Bor-Her Chen, and J. M. White. 9 Jun 82, 20p Rept no. TR-23
Contract N00014-75-C-0922

Platinum, suppported on TiO2, TiO and Ti2O3 in various forms, has been investigated using a variety of physical and chemical techniques. On H2 pretreated TiO2, on TiO and on Ti2O3 samples (all platinized), SMSi behavior, i.e. limited H2 uptake, was noted. Very fast H-for-D exchange rates were observed for H2D2 mixtures on all these materials indicating that dissociative adsorption still occurs readily. Using XPS, SAES, TEM and STEM data we conclude that surface contamination, diffusion of Pt into the bulk oxide, Formation of surface mixed metal oxides and metal agglomeration are not significant contributors to the observed loss of H2 uptake capacity. On the basis of qualitative bulk electrical conductivity data and XPS data, we suggest that the SMSI effect is best understood in terms of a bulk oxide reduction model. In this model, bulk conduction band electrons tunnel readily through a thin TiO2 layer at the surface to reach Pt particles where they are trapped and furnish a negatively charged Pt particle with good capacity for dissociating H2 but weak binding of atoms. (Author)

AD-A117 904/3 PC **A09**/MF **A01**
Carnegie-Mellon Univ., Pittsburgh, PA. Dept. of Chemistry.
Physical-Chemical Properties of Articulated Rod-like Polymers.
Annual rept. Mar 80-Feb 81,
G. C. Berry, C. C. Lee, Y. Einaga, and R. Furukawa. Oct 81, 183p AFWAL-TR-81-4092
Contract F33615-79-C-5034

Investigation on solutions of rodlike poly(p.phenylene benzobisthiozole), PBT, and articulated modification of PBT and poly (p.phenylene benzobisoxazole), PBO, are reported in three parts: dilute solution characterization of PBT and articulated PBO and PBT copolymers; rheological and rheo-optical studies on concentrated solutions of PBT; and solution processing of PBT into oriented ribbons using an improved version of the Wong-apparatus. In the first section, the effects of interchain association are studied. It is found that each of four articulated PBO copolymers studied is aggregated, even in dilute solution, and that the aggregation of a PBT sample studied depends on its solution/precipitation history. In the second section, the transient behavior leading to steady state flow, and the relaxation subsequent to cessation of flow are studied, with recommendations for solution processing. In the third section, solution processing methods to fabricate well oriented ribbons of PBT are studied, leading to a ribbon with a modulus of 600 g/denier for the specimen with highest modulus. (Author)

AD-A117 928/2 PC **A04**/MF **A01**
Virginia Inst. of Marine Science, Gloucester Point.
Hydrocarbon Fuel Chemistry: Sediment Water Interaction.
Final rept. Nov 80-Nov 81,
W. G. MacIntyre, C. L. Smith, P. O. DeFur, and C. W. Su. Nov 81, 61p AFESC/ESL-TR-82-06
Contract F08635-81-C-0019
Includes ten microfiche inserts.

The objective of this program was to determine the effect of sediments on aqueous solutions of selected Air Force hydrocarbon fuels. Effects of sediment type, organic carbon content, pH, temperature and salinity on interaction of dissolved hydrocarbons with sediment were studied. The results of this work can be used to estimate the role of sediment-hydrocarbon interaction terms in fate models of aqueous systems.

AD-A117 947/2 PC **A03**/MF **A01**
Indiana Univ. at Bloomington. Dept. of Chemistry.
Metal Alkoxides - Models for Metal Oxides.
Technical rept.,
Malcolm H. Chisholm. 29 Jul 82, 30p Rept no. INDU/DC/TR-82/3-MC
Contract N00014-79-C-0044

A structural analogy is noted between metal-oxides, metal-alkoxides and metal-oxide-alkoxides. This relationship holds for d(O) complexes and for d(n) complexes where the electrons may be used to form M-M bonds which may be used to form M-M bonds which may be localized and of either single or multiple bond order, or, delocalized in cluster molecular orbitals. These electrons in M-M bonds provide for oxidative-addition reactions and the binding of pi-acid ligands such as CO and alkynes. An extensive organometallic chemistry is implicated and certain facets of this are influenced by the pi-donor properties of oxo and alkoxy ligands. (Author)

DE81700867 PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Application of Neutron Activation and High Resolution X-Ray Spectrometry to the Development of Analytical Methods Suitable for the Assay of Trace Elements in Biological Materials. Part of a Coordinated Programme on Comparative Methods for the Study of Trace Elements in Human Nutrition. Final Report for the Period 15 October 1974 - 31 March 1980.
J. Mantel. Dec 80, 13p IAEA-R-1546-F
U.S. Sales Only.

A new method for determining trace elements in biological materials by instrumental neutron activation analysis (INAA) has been investigated. This method is based on the measurement of low-energy X-rays emitted by the sample after appropriate activation with thermal neutrons. The X-rays were detected by a Si(Li) diode connected to a multichannel analyser. The background in the energy region of interest was reduced by means of an electromagnet which deflects high-energy beta-particles away from the detector. This method of measurement has been evaluated by application to a number of different biological reference materials. The use of the electromagnet for background reduction was shown to be extremely effective for several radionuclides that are common sources of disturbance in INAA. For exp 32 P the background was only 0.8% of its original value. For real samples the background reduction depends somewhat on the matrix and therefore varies from one material to another. Practical detection limits for typical biological materials were derived for 18 different trace elements. The use of a perspex absorber was also considered as an alternative to magnetic deflection of the beta rays. In practice, magnetic deflection is preferable for the lower-energy X-ray emitters such as the activation products of Co, Cr, Cu and Zn. (Atomindex citation 12:626437)

DE82008705 PC **A03**/MF **A01**
Florida Univ., Gainesville.
Synthesis and Characterization of Novel Polymers from Non-Petroleum Sources for Use in Enhanced Oil Recovery. Progress Report, July 1,1981-June 30, 1982.
G. B. Butler, and T. E. Hogen-Esch. 1982, 32p DOE/ER/05947-3
Contract AS05-78ER05947
Portions of document are illegible.

Annual progress reports are presented for the following tasks: (1) synthesis and structural characterization of polysaccharide-based graft copolymers for use in tertiary oil recovery; (2) determination of physical properties of the polymers and their solutions, and screening of the polymers to determine their utility in oil recovery. Over the past year synthesis and characterization studies have continued in the following five areas: (1) starch-g-polyacrylamide (ST-g-PAM) copolymers; (2) graft copolymers of other polysaccharides (gum arabic, yellow dextrin, pectin, okra polysaccharide, and guar gum) and acrylamides; (3) a naturally occurring polysaccharide extracted from okra (Akro); (4) graft copolymers of Schardinger- beta -dextrin and acrylamide (SD-g-PAM); (5) chemical degradation of ST-g-PAM and SD-g-PAM copolymers. For physical properties studies, the following areas were investigated: (1) characterization of copolymers by ultracentrifugation, size exclusion chromatography and nucleophore membrane filtration; (2) rheological studies on copolymers; and (3) statistical analysis of variables in graft copolymerization. (ERA citation 07:044291)

DE82008823 MF **A01**
Oak Ridge National Lab., TN.
Positron Spectroscopy Applied to the Analysis of Surfaces.
L. D. Hulett, J. M. Dale, S. Pendyala, Y. K. Chang, and W. S. Lyon. 1982, 3p CONF-820335-4
Contract W-7405-ENG-26
International symposium on applications and technology of ionizing radiations, Malaz, Riyadh, Saudi Arabia, 12 Mar 1982.
Available in microfiche only.

Developments in positron sources and electron spectrometers for surface analysis are briefly discussed.

DE82009003 MF **A01**
Toledo Univ., OH. Dept. of Physics.
Semiempirical Studies of Atomic Structure. Progress Report, 1 July 1980 to 30 June 1982.
L. J. Curtis. 1982, 14p DOE/ER/10676-1
Contract AS05-80ER10676
Portions of document are illegible. MN only.
Microfiche copies only.

A program of semiempirical studies of the properties of the very heavy and very highly ionized atomic systems which often occur as contaminants in controlled fusion devices is being carried out. The high precision requirements for spectroscopic analysis of these systems can exceed the capabilities of present ab initio theoretical methods, but semiempirical approaches have been found that provide very accurate predictions. Empirical model parametrizations of existing data have revealed unexpected linearities that have been exploited to make extensive predictions along isoelectronic and homologous sequences. These empirical regularities also provide insight into the theoretical approximations that can be applied to these extremely relativistic atomic systems. Experimental measurements of the semiempirical predictions are carried out as part of the program, both to test the methods and to enlarge the data base. (ERA citation 07:048326)

DE82009030 MF **A01**
Sandia National Labs., Albuquerque, NM.
Borates of Trivalent Iron.
N. B. Burchinskaya. Mar 82, 22p SAND-82-6009
Contract AC04-76DP00789
A , Ukr. Khim. Zh. (Russ. Ed.), 30 n2 P177-186 Mar 1982.Portions of document are illegible.
Available in microfiche only.

Iron borates of composition Fe sub 2 O sub 3 .3B sub 2 O sub 3 .3H sub 2 O and 3Fe sub 2 O sub 3 .4B sub 2 O sub 3 .15H sub 2 O were synthesized. The study of the solubility of iron borate in boric acid led to the proposal that soluble complex borates of trivalent iron are formed. The absorption spectra of systems of iron (III) salt - water and iron (III) salt - boric acid - water were studied, and a maximum near 280 m mu was observed on the curve of the latter system. Photometric study of

the equilibrium systems: Fe exp 3+ - H sub 3 BO sub 3 - H sub 2 O; (C sub 6 H sub 5 OFe) exp 2+ - H sub 3 BO sub 3 - H sub 2 O; (FeSal sub 2) exp - - H sub 3 BO sub 3 - H sub 2 O; (FeAc sub 3) exp + - H sub 3 BO sub 3 - H sub 2 O established the composition of the iron borates formed in the solution. The interaction of Fe exp 3+ and BO sub 2- is discontinuous. Depending on the pH of the solution, either a monoborate (pH less than or equal to 2.5), diborate (pH 3-4.5) or triborate (pH 5 to 6) of iron may form. Instability constants of the iron borates were calculated. The experimental instability constant of iron monoborate K sub 1 was found to be 3.12 10 exp -9 , K sub 2 and K sub 3 (calculated theoretically) are 2.69 10 exp -16 and 2.57 10 exp -21 respectively. In addition K sub 3 was found experimentally to be 4.95 10 exp -21 , which agrees comparatively well with the theoretical value.

DE82009112 MF **A01**
Purdue Univ., Lafayette, IN. Dept. of Chemistry.
Reactions of Metal Ions and Their Clusters in the Gas Phase Using Laser Ionization: Ion Cyclotron Resonance Spectroscopy. Progress Report, July 1, 1981 to June 30, 1982.
B. S. Freiser. Mar 82, 26p DOE/ER/10689-2
Contract AC02-80ER10689
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

This past year we completed construction of a second ion cyclotron resonance (ICR) spectrometer and put into operation a state-of-the-art Nicolet Fourier transform mass spectrometer (FTMS). The FTMS has been operating well beyond our expectations and, together with a new Quanta Ray pulsed Nd:YAG laser obtained this year, has greatly advanced our capabilities for studying atomic metal ion chemistry. Of particular note was our demonstration for the first time of the capability of FTMS to perform collision-induced dissociation (CID). I believe that our work, catalyzed by the unique combination and capabilities of laser ionization and FTMS, has gained national and international attention and has put our group on the forefront of both the areas of gas phase metal ion chemistry and analytical mass spectrometry. (ERA citation 07:047539)

DE82011266 PC **A03**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Fast Biomass Pyrolysis with an Entrained-Flow Reactor.
M. Bohn, and C. Benham. Feb 82, 29p SERI/TP-252-1398, CONF-820202-6
Contract AC02-77CH00178
AICHE 1982 national winter meeting, Orlando, FL, USA, 28 Feb 1982, Portions of this report are illegible.

A tubular entrained flow reactor has been used to study the effect of process control variables on fast biomass pyrolysis. In this type of reactor, finely ground biomass particles are entrained by carrier gas and transported through a reactor tube which is heated to about 900 exp 0 C. Biomass particles pyrolyze as a result of heat transfer from the reactor wall yielding a gas composed primarily of carbon monoxide, carbon dioxide, hydrogen, methane, and unsaturated hydrocarbons. In this experimental program three dependent variables, percent conversion to gas, gas composition, and process heat, have been measured as a function of several process control variables. These process variables include reactor temperature, carrier gas to biomass flow ratio, reactor residence time, biomass particle size, and reactor Reynolds number. The data allow one to design and predict the performance of large scale reactors and also elucidates heat transfer mechanisms in fast biomass pyrolysis. (ERA citation 07:046248)

DE82011724 PC **A07**/MF **A01**
Physical Sciences, Inc., Woburn, MA.
Hydrocarbon Autothermal Reforming Program. Final Technical Report, 28 September 1979-31 October 1981.
D. O. Ham, P. F. Lewis, G. W. Lord, R. M. Yarrington, and H. S. Hwang. Feb 82, 139p DOE/MC/12734-1138
Contract AC21-79MC12734
Portions of this report are illegible.
Microfiche only after original copies are exhausted.

The goal of the PSI program was to understand the mechanisms of the formation of carbon deposits under conditions relevant to authothermal reformers (ATR). The first year of this two year program was dedicated almost entirely to investigations of gas phase soot formation. It was speculated that soot could form in the gas phase and deposit downstream in the catalyst bed. A high temperature experimental test rig was constructed and comptuer models developed to aid in understanding this process. The conclusion of these studies is that soot does not form in the gas phase upstream of the catalyst bed, under ATR conditions, at least, not under well mixed conditions. In the second year, the program was redirected to study carbon formation processes on surfaces and to perform testing and analysis of Engelhard's six inch ATR rig. This work has resulted in an operational computer code for use in modeling the Engelhard ATR. This code requires rate constant information for performance prediction. The PSI laboratory experiments have shown that coke formation on surfaces of nickel catalysts is very rapid, particularly from olefins. Filamentary carbon was formed. Various relevant processes and their relative rates were studied on various nickel surfaces. Coke was not observed when precious metal catalysts were used. Testing on the Engelhard reactor was performed. These preliminary tests show that the Engelhard catalysts can be used to reform number two fuel oil with no problems associated with carbonaceous deposits. Some hydrocarbon breakthrough was observed, increasing at low oxygen to carbon ratio (0.355). These limited data clearly indicate a high potential for a useful ATR. Further testing and analysis are clearly necessary. (ERA citation 07:049467)

DE82011850 PC **A02**/MF **A01**
Wayne State Univ., Detroit, MI.
Photochemical Activation and Reactivity of Polynuclear Transition-Metal-Complex Molecules. Progress Report, June 1981-May 31, 1982.
J. F. Endicott, and R. L. Lintvedt. Jan 82, 11p DOE/ER/04685-1-82
Contract AS02-78ER04685

Significant results obtained during the year are summarized for the following programs: (1) reversible, two electron transfer at a single potential in binuclear complexes; (2) photophysics of polyketonate complexes; (3) synthetic strategies and characterization of heavy metal heterobinuclear complexes; (4) high yield synthesis of ligands capable of binding 3 and 4 metal ions per molecule. Electrochemical studies have uncovered a number of new binuclear metal complexes that undergo reversible two-electron reduction at single potential including Cu(II) complexes with two different coordination environments, mixed Ni(II), Cu(II) complexes and binuclear Ni(II) complexes. In each case the species that exhibit these electron transfer properties have been shown to be Na exp + ion-paired complexes. Several new trinuclear molecular complexes have been prepared and characterized that contain two UO sub 22+ ions and one transition metal ion. The electrochemistry, absorption spectra, and luminescence have been investigated. (ERA citation 07:044299)

DE82011957 PC **A02**/MF **A01**
Chicago Univ., IL. Dept. of Chemistry.
Synthesis, Chemistry, and Catalytic Activity of Complexes of Lanthanide and Actinide Metals in Unusual Oxidation States and Coordination Environments. Progress Report, February 1, 1981-January 31, 1982.
W. J. Evans. Jul 81, 6p DOE/ER/04216-T1, COO-4216-10
Contract AS02-77ER04216

The objectives of this research project are: (1) to demonstrate experimentally that the lanthanide and actinide metals have a more extensive chemistry than is presently known; (2) to develop a better understanding of the special features of the f orbital elements which will allow the design of f orbital complexes possessing unique chemical and physical properties; (3) to provide a basis for seeking unusual catalytic transformations involving these elements; and (4) to synthesize and explore the chemical and physical properties of mixed metal complexes which contain both lanthanide and transition metals. During the past year progress was made in each area. Some of the specific results are: (1) the first activation of CO by an organolanthanide complex was demonstrated; (2) the first, crystallographically characterized, molecular lanthanide hydride complexes, the bridged dimers, ((C sub 5 H sub 4 R) sub 2 LnH(THF)) sub 2 (R=H, CH sub 3 ; Ln=Lu, Er, Y), were synthesized by hydrogenolysis of the appropriate (C sub 5 H sub 4 R) sub 2 Ln(C(CH sub 3) sub 3)(THF) complex; (3) ((C sub 5 H sub 5) sub 2 (THF)ErH) sub 2 was found to catalyze the homogeneous hydrogenation of alkynes; (4) the first trimetallic organolanthanide complex was synthesized; (5) the first polyhydridic organolanthanide complex was synthesized; (6) U(III) hydride was found to catalytically activate molecular hydrogen in alkene and alkyne hydrogenation reactions. (ERA citation 07:044275)

DE82011980 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Autoionizing and High-Lying Rydberg States of Lutetium Atoms.
C. C. Miller, and N. S. Nogar. 1982, 6p LA-UR-82-609, CONF-820336-3
Contract W-7405-ENG-36
Optical Society of America topical meeting on laser techniques for extreme ultraviolet spectroscopy, Boulder, CO, USA, 8 Mar 1982.

Two color multiphoton ionization has been used to examine the spectroscopy of Lu atoms near the ionization threshold of 5.43 electron volts (43,800 cm exp -1).

DE82012070 MF **A01**
Lawrence Livermore National Lab., CA.
Continued Investigations into Techniques Producing Selective Chemical Reactions on Surfaces and Target Spheres and Related Studies. Final Report.
M. B. Denton. 19 Feb 82, 91p UCRL-15441
Contract W-7405-ENG-48
Portions of document are illegible.
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This report describes efforts leading to the development and characterization of a compact ion source and optical transfer system producing relatively high current density ion beams. The ion source and beam transfer system represent a major advance in the state of the art in that high current densities at low kinetic energies have been achieved for high molecular weight polyatomic ions. Indeed, the ion beams produced display ion abundance patterns typical of simple low energy electron impact ionization processes. (ERA citation 07:042664)

DE82012344 PC **A03**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Ocean Thermal Energy Conversion (OTEC) Particulate Program 1980, St. Croix (VOTEC). Final Report.
G. A. Knauer, and A. R. Flegal. Aug 81, 43p LBL-14115
Contract AC03-76SF00098
Microfiche only after original copies are exhausted.

Project objectives were to develop and evaluate methods for sampling and analyzing the particulate matter in sea water at potential OTEC sites. Principal sampling methods employed were a particle interceptor trap system which was lost, large-volume water samplers and plankton nets. Analytical methods used included atomic absorption spectrophotometry, neutron activation analysis, x-ray fluorescence, and isotope dilution mass spectrometry. Extraction methods for trace elements and means of determining other data are described. Supporting data include temperature, salinity, labile nutrient concentrations, biomass measurements based on the chlorophyll analysis, primary productivity, and plankton taxonomy. (ERA citation 07:044753)

DE82013382 PC **A04**/MF **A01**
Massachusetts Inst. of Tech., Oak Ridge, TN. School of Chemical Engineering Practice.
Tracer Study of Batch Sedimentation.
P. C. Bigot, and A. H. Lee. Apr 82, 61p ORNL/MIT-341
Contract W-7405-ENG-26
Portions of document are illegible.

The initial particle-concentration profile in batch settling tests was assessed and determined to be uniform. Two sets of data for batch-settling tests using cobalt-57-traced ion-exchange resin beads (45 and 62 mu m in diameter) were compared with existing theories and models. A single suspended-solids zone was observed in agreement with the predictions of Dixon; the Richardson-Zaki correlation predicted the settling velocity as a function of void fraction to within 5%. Studies with a bimodal particle-size distribution of equal fraction of 45- and 62- mu m particles showed that the larger particles settled at the same velocity as in a single-particle-size distribution but that the smaller ones settled slower than for a single-particle-size distribution at a given void fraction. The ratio of the set-

tling velocity of the smaller particles in a bimodal-particle-size distribution u/sub b/ to the settling velocity of these particles in a single particle-size distribution u/sub s/ was correlated by raising to the (3.78 +- 0.47) power the effective void fraction of the resulting upper settling zone containing only the smaller particles. (ERA citation 07:044271)

DE82701189 MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Effects of Thermodynamic Properties of Hydrogen Isotopes on Separation Characteristics of Cryogenic Distillation Columns.
M. Kinoshita, and Y. Naruse. Dec 80, 44p JAERI-M-9238
In Japanese.
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

The principal objective of this report is to investigate the effects of thermodynamic properties of hydrogen isotopes such as the vapor-liquid equilibrium relation, the latent heat of vaporization, the specific heat of gas and liquid, and so on, on separation characteristics of cryogenic distillation columns. It was revealed that Raoult's law deviation of the solutions of hydrogen isotopes has relatively large effects while the other thermodynamic variables have relatively minor effects. Simulation with the assumption of Raoult's law is expected to fail to make exact prediction of the quantity of the infinitesimal amount of element in the output streams. This report points out the importance of incorporation of Raoult's law deviation and decay heat of tritium in the simulation model. In addition, the experimental studies for more accurate vapor-liquid equilibrium data are to be continued for the time being. (Atomindex citation 13:657897)

DE82701217 PC **A02**/MF **A01**
International Atomic Energy Agency, Seibersdorf (Austria). Labs.
IAEA'S Programme in Analytical Quality Control.
O. Suschny. Oct 80, 25p IAEA-RL-70
U.S. Sales Only.

The purpose of the Analytical Quality Control Programme of the International Atomic Energy Agency is to help laboratories in the Agency's Member States to assess and, if necessary, to improve the reliability of their analytical work in areas related to nuclear technology and radioisotope utilization. This is done by the organization of analytical intercomparisons and by the provision of certified or uncertified reference materials. Recently, intercomparisons have been organized of trace element analysis in a soil and a lake sediment sample which have led to the certification of two new reference materials, SOIL-5 and SL-1 (lake sediment). A technique has been developed to recognise and to remove outlying results. Criteria have been established to classify element-concentration values into the categories established with a high degree of confidence, established with a reasonable degree of confidence and information value only. Four radionuclide intercomparisons have recently been carried out: W-1/1 and W-2/1 of the determination of selected radionuclides in water and Air-1/1 and Air-2/1 of that of selected radionuclides on simulated air filters. Details of the preparation of materials for these intercomparisons, and of data treatment and some results are discussed in the paper. (Atomindex citation 13:658450)

DE82701219 PC **A05**/MF **A01**
Atomic Energy of Canada Ltd., Pinawa (Manitoba). Whiteshell Nuclear Research Establishment.
Assessment of Iodine Behaviour in Reactor Containment Buildings from a Chemical Perspective.
R. J. Lemire, J. Paquette, D. F. Torgerson, D. J. Wren, and J. W. Fletcher. Jun 81, 77p AECL-6812
U.S. Sales Only.

Thermodynamic parameters for aqueous and gaseous iodine species at 25 exp 0 C have been obtained from the literature and a data base has been constructed that is consistent with CODATA values. Using the 25 exp 0 C data base, Gibbs energies for the iodine species have been calculated as a function of temperature to 150 exp 0 C. Results are presented in terms of potential-pH diagrams, species distribution diagrams, and liquid-gas partition-coefficient plots. Iodine chemistry in the fuel, in the primary coolant system, and in the containment building atmosphere is also discussed. This assessment of iodine behaviour clearly shows that there is considerable scope for limiting the concentration of airborne iodine in reactor containment buildings following a loss-of-coolant accident in which fuel failure occurs. (Atomindex citation 13:658540)

DE82701220 PC **A05**/MF **A01**
Atomic Energy of Canada Ltd., Chalk River (Ontario). Chalk River Nuclear Labs.
Chemistry and Materials Division Progress Report, 1 October-31 December 1980.
Feb 81, 83p AECL-7242, PR-CMa-55
U.S. Sales Only.

Experiments with aluminum-indium single crystals in which the indium atoms occupy interstitial positions have enabled the first direct measurements of ion flux gradients to be made for a particular channel. A search is being carried out for tri-, tetra-, and hexa-vacancy clusters centered on interstitial indium or tin atoms in irradiated copper single crystal alloys. Work on hydrogen and helium ion scattering at keV energies from tungsten and tungsten oxide. Research is being carried out on dithiothreitol in aqueous solution with nitrate ion to improve understanding of the radiation chemistry of sulphydryl compounds. A short pulse carbon dioxide laser is being used in experiments on the multiphoton absorption and decomposition of alcohols. The separation factor for isotope exchange between heavy water and hydrogen gas has been measured as a function of temperature from 5 to 95 exp 0 C. A procedure has been developed for the determination of gadolinium, samarium, europium and dysprosium at levels down to 10 exp -7 g.g exp -1 in ThO sub 2 by emission spectroscopy. It is now possible to determine uranium with high precision and accuracy in 2% uranium-thorium dioxide fuel by controlled potential coulometry. It has been shown that cracking of Zr-2.5% Nb in hydrogen gas is not pressure-dependent. The solubility of tin in zirconium has been studied. (Atomindex citation 13:658541)

DE82701223 MF **A01**
Israel Atomic Energy Commission, Beersheba. Nuclear Research Center-Negev.
Feasibility of Ion Separation by Carbon Electrodes.
Y. Oren, and A. Soffer. Jun 79, 17p NRCN-467
In Hebrew.
U.S. Sales Only. Available in microfiche only.

The feasibility of ion separation through adsorption on carbon electrodes was investigated by electroadsorption of the following ions: Li exp + , Na exp + , Sr exp 2+ , and Mg exp 2+ . No meaningful differences were observed in the adsorption of these ions on two types of carbon powder electrodes. Therfore, these electrodes cannot be used for isotope separation. Examination of ultramicroporus carbon electrodes as well as TiS sub 2 electrodes is suggested. (Atomindex citation 13:658628)

DE82701481 MF **A01**
Electricite de France, Paris. Direction de la Production et du Transport.
Monochloramine Determination Using NN Diethyl-p-Phenylene-Diamine. Influence of Iodide Traces.
J. M. Fiquet. Sep 80, 24p EDF-R-80DD01948
In French.
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

When determining D.P.D. free oxidizers, the monochloramine interferes in particular for iodide levels analogous to those likely to be found in sea water. This is not so for iodate. The zero time extrapolation of the change in color curve is one method that enables the method to be made more selective. (Atomindex citation 13:660984)

DE82701482 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics.
Elemental-Composition Analysis by the Measurement of Characteristic X-Ray Radiation Excited by the 1-3.5 MeV Proton Beam.
E. Braziewicz, J. Braziewicz, 1981, 18p JINR-18-81-503
In Russian.
U.S. Sales Only.

A method is reported for the determination of elemental composition of thin and thick targets from biological, geological and semiconducting materials. The composition is investigated by measuring the characteristic x-ray radiation after the targets were excited by a beam of protons from the electrostatic accelerator (JINR, Dubna). The accuracy of determination for thin targets was within the interval 3-5 x 10 exp -9 g/g, for thick targets - 5 x 10 exp -7 g/g. (Atomindex citation 13:660990)

DE82701483 PC **A02**/MF **A01**
UKAEA, Risley (England). Nuclear Power Development Establishment.
Vanadium/Oxygen System in the Analysis of Sodium for Oxygen.
J. A. J. Walker, and W. B. Price. May 81, 15p ND-R-565(R)
U.S. Sales Only.

An investigation of the V-O-Na system at 1023 K is described for oxygen in sodium contents of 5 to 25 ppM. Electron spectroscopy combined with depth profiling is used to determine the vanadium/oxygen ratios inwards from the surface of vanadium foil and these ratios are compared with theoretical predictions. The validity of the vanadium wire technique as an analytical method is examined and a model for the vanadium oxidation is suggested. (Atomindex citation 13:660991)

DE82701484 PC **A02**/MF **A01**
Institute of Nuclear Physics, Krakow (Poland).
Infrared Studies on Complexes Between Octaethyltetraamidepyrophosphate (OETAPP) And Uranyl Salts.
P. Grychowski, J. Mikulski, Ya. Moravets, V. Shara, and L. Shourkova. 1981, 12p INP-1143/C
In Russian.
U.S. Sales Only.

Uranyl nitrate and uranyl chloride were extracted from the water phase with CHCl sub 3 solution of octaethyltetraamidepyrophosphate (OETAPP). Infrared spectra of the organic phases were recorded before and after the extraction. For both systems, the frequency of the P = O stretching mode of OETAPP after the extraction was lowered, which indicates for the formation of OETAPP UO sub 2 (NO sub 3) sub 2 and OETAPP UO sub 2 Cl sub 2 complexes. If uranyl nitrate was extracted with OETAPP in CCl sub 4 a precipitate was formed in the solution. From the analysis of the IR spectrum of the precipitate it was concluded that the complex OETAPP UO sub 2 (NO sub 3) sub 2 was formed also in this case, however, the complex was insoluble in CCl sub 4 . (Atomindex citation 13:661019)

DE82701486 PC **A08**/MF **A01**
Israel Atomic Energy Commission, Beersheba. Nuclear Research Center-Negev.
New Catalytic Transformations of Carbinols Catalyzed by Transition Metal Complexes.
I. Pri-Bar. Sep 81, 159p NRCN-477
In Hebrew.Thesis.
U.S. Sales Only.

Several platinoid metal catalysts have been shown to promote reductive coupling, dehydration, disproportionation, and dehydrogenation of diarylcarbinols. Mechanistic studies were performed at 180 to 210 exp 0 C with benzhydrol as substrate and RuCl sub 2 (PPh sub 3) sub 3 as catalyst. Ruthenium alkoxides are implied as common reaction intermediates in all four catalyses. Ruthenium hydrides are suggested to take part in the reductive coupling, disproportionation, and dehydrogenation processes. Some aliphatic and primary aromatic alcohols that do not react by themselves in the presence of RuCl sub 2 (PPh sub 3) sub 3 can both serve as active hydrogen donors and form crossover products in the presence of secondary and tertiary aromatic carbinols. (Atomindex citation 13:661022)

DE82701487 PC **A02**/MF **A01**
UKAEA, Risley (England). Nuclear Power Development Establishment.
Preparation Standardization and Use of Plutonium Nitrate Reference Solutions.
M. L. Brown, and J. L. Drummond. Jul 81, 15p ND-R-623(D)
U.S. Sales Only.

A procedure is described for the purification of a plutonium nitrate solution in nitric acid for use as a plutonium master standard. Anion exchange chromatography followed by oxalate precipitation is used to purify the plutonium and the residual cationic impurities are analysed by emission spectroscopy. The plutonium content is accurately and precisely measured by two independent methods, namely by gravimetry as PuO sub 2

at 1250 exp 0 C and by ceric oxidation, ferrous reduction and dichromate titration. Full details of the purification procedure are given, with recommended methods for storing and using the standard solution. It is concluded that such a solution is the most satisfactory reference material, available for plutonium analysis for reprocessing plants, and is adequately related to other, internationally accepted, standard reference materials. (Atomindex citation 13:661247)

DE82780326 MF **A01**
Universidad Autonoma de Queretaro (Mexico). Escuela de Ciencias Quimicas.
Uranium Analysis in Water Flowing by the Nuclear Track Detection Method on Solid Dielectric Materials.
H. Arambula. 1981, 56p INIS-mf-6814
In Spanish.Thesis.
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

The objective of this experiment was threefold: to study the content of uranium in tap and spring water, to establish a technique for the quantitative analysis for the presence of uranium in liquids, and to test the qualities as detector fission fragments of three solid insulator materials using the nuclear tracks register method. The latter allows for the measurement of concentrations of fissile elements up to 10 exp -12 gr/gm employing (n, f.f.) reactions. The test samples were of tap water and of water from six fresh water springs located in San Luis Potosi and Guanajuato. Glass, lexan polycarbonate and muscovite mica were the detector materials used. The technique consisted in evaporating the water from the test samples, which had been previously placed upon the detector materials, and in doing the same for the standard control sample solutions having known concentrations of uranium. All the samples were then irradiated with thermal neutrons, and the exp 235 U, present in the samples, fissioned. The fission fragments produced permanent damage on the detectors, known as latent tracks. A specific corroding chemical was then applied to each detector which caused the latent tracks to dissolve into grooves. Known as etching tracks, these grooves were microscopically visible and could be measured for track density (tracks/mm exp 2). The concentrations of uranium present in the test samples were measur. (Atomindex citation 13:647152)

DE82780327 MF **A01**
Agricultural Univ., Wageningen (Netherlands).
Homoaromatics as Intermediates in the Substitution Reactions of 1,2,4,5-Tetrazines with Ammonia and Hydrazine.
A. D. Counotte-Potman. 29 May 81, 113p INIS-mf-6606
Thesis.
U.S. Sales Only. Available in microfiche only.

This thesis describes some nucleophilic substitution reactions between the red 1,2,4,5-tetrazines and hydrazine-hydrate or ammonia. Special attention was paid to the occurrence of the Ssub(N) (ANRORC) mechanism in these substitution reactions. This mechanism comprises a sequence of reactions, involving the addition of a nucleopile to a heteroaromatic species, followed by a Ring-Opening and Ring Closure reaction to the substitution product. 3-Alkyl(aryl)-1,2,4,5-tetrazines were found to undergo a Chichibabin hydrazination into 6-hydrazino-3-alkyl(aryl)-1,2,4,5-tetrazines on treatment with hydrazine-hydrate. The first step in this reaction sequence was the formation of a homoaromatic sigma-adduct. Subsequently an open-chain intermediate was observed by NMR, on raising the temperature. Finally the hydrazino compound is formed by ring closure. This reaction sequence can be considered as an Ssub(N)(ANRORC) process. With exp 15 N-labelled hydrazine, only part of the label was found to be built in the 1,2,4,5-tetrazine ring of the 6-hydrazino compounds. This is the first example of a reaction in which both the hydrazino compound with the exp 15 N-label in the ring and with the exp 15 N-label in the exocyclic hydrazino group are formed according to the Ssub(N)(ANRORC) mechanism. (Atomindex citation 13:647205)

DE82780332 MF **A01**
Instituto Biologico, Sao Paulo (Brazil). Centro de Radioisotopos.
Sorption and Desorption of Insecticides in Brazilian Soils.
L. C. Luchini, K. A. Lord, and E. F. Ruegg. 1980, 8p INIS-mf-6762
In Portuguese.
U.S. Sales Only. Available in microfiche only.

The sorption from aqueous solution of ten Brazilian soil types of four organochlorine, two organophosphorus and one carbamate insecticide was determined in the laboratory using gas chromatographic and radiometric techniques. Measurements showed that soil3 richest in organic matter sorbed all substances except aldrin more strongly than the other soils. DDT was the most and aldrin the least sorbed organochlorine pesticide, being dieldrin sorbed two to four times more strongly than aldrin. Sorption of lindane varied in different soils. The organophosphate insecticides malathion and parathion were strongly sorbed in the soils richest in organic matter and weakly sorbed in the poorest soils being moderately sorbed by the other soils. Sorption of carbaryl by all soils is small. Lindane was desorbed from the soil richest in organic matter and the extent of desorption was dependent on the sorption time. (Atomindex citation 13:647738)

DE82780459 MF **A01**
Akademie der Wissenschaften der DDR, Leipzig. Zentralinstitut fuer Isotopen- und Strahlenforschung.
Reports of the Zentralinstitut fuer Isotopen und Strahlenforschung.
Mar 81, 78p ZFI-Mitt-35
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

Selected papers are indexed separately.

DE82901165 MF **A01**
Vienna Univ. (Austria).
Pulsed Radiolytic Investigations into the Formation and Oxidation of Organic Radicals in Aqueous Solutions.
J. Eibenberger. 1979, 108p NP-2901165
In German.Thesis.
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

The reactions of the primary radical of water radiolysis, OH/sup ./, with ethers and acetals, and those of the secondary radical SO sub 4 /sup ./ exp - with alcohols and ethers have been investigated in aqueous solutions. Furthermore, the mechanism of the oxidation of alpha -alkoxyalkyl radicals by tetranitromethane (TNM) has been elucitated. The fast processes could be studied by using the pulse-radiolysis technique. The pulsed radiolysis oscillograms were evaluated by conductivity, optical and ESR measurements. It can be concluded from the results that the SO sub 4 sup(.) exp - radical reacts with the investigated substrates under H abstraction forming C radicals. The attack of the OH radical on the substrate molecules shows a clear regioselectivity which is explained by the electrophilic behaviour of the OH radical. The oxidation of alpha -alkoxyalkyl radicals by tetranitromethane takes place via adducts as intermediate products whose decay is brought about by a heterolytic cleavage as cate-determining step (SN mechanism). (ERA citation 07:044307)

N82-27420/0 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Nickel Hydroxide Electrode. 3: Thermogravimetric Investigations of Nickel (II) Hydroxides.
W. Dennstedt, and W. Loeser. Jan 82, 13p NASA-TM-76666, NAS 1.15:76666
Contract NASW-3542
Transl. Into English from Electrochim. Acta (Northern Ireland), 1971, V. 16, No. 3 p 429-435. Transl. Into Scientific Translation Service, Santa Barbara, Calif.

Water contained in Ni hydroxide influences its electrochemical reactivity. The water content of alpha and beta Ni hydroxides is different with respect to the amount and bond strength. Thermogravimetric experiments show that the water of the beta Ni hydroxides exceeding the stoichiometric composition is completely removed at 160 deg. The water contained in the interlayers of the beta hydroxide, however, is removed only at higher temperatures, together with the water originating from the decomposition of the hydroxide. These differences are attributed to the formation of II bonds within the interlayers and between interlayers and adjacent main layers. An attempt is made to explain the relations between water content and the oxidizability of the Ni hydroxides.

N82-27421/8 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Contribution to the Knowledge of Nickel Hydroxide Electrodes. 5. Analysis and Electrochemical Behavior of Cadmium Nickel Hydroxides.
H. Bode, and W. Dennstedt. Dec 81, 17p NASA-TM-76716, NAS 1.15:76716
Contract NASW-3542
Transl. Into English from Electrochim. Acta, V. 17, 1972 p 106-118. Transl. By Scientific Translation Service, Santa Barbara, Calif. Original DOC. Prep. By Varta, Research and Development Center, Kelkheim/TS, West Germany.

Electrochemical experiments performed at sintered and bulk electrodes show that beta nickel hydroxide contains an electrochemically inactive proportion of cadmium hydroxide of up to 10%. The electrochemically ineffective cadmium hydroxide is homogeneously dissolved in beta nickel hydroxide.

N82-27457/2 PC **A02**/MF **A01**
Societe Nationale Industrielle Aerospatiale, Les Mureaux (France).
Hugoniot's Calculations on Compact Boron from Properties at Normal Pressure.
M. Puech, and J. P. Dupuis. 10 Aug 81, 7p SNIAS-821-422-107
Text in French. Presented at 8TH Airapt Conf. And 19TH Ehprg Conf., Uppsala, Sweden, 17-22 Aug. 1981.

Polar compact boron shock and its metastable phase were calculated from the sublimation energy and the speed of sound at zero pressure. The equations of state were formulated. The speed of sound in a dense monocrystalline boron sample was measured. Polar shock calculation results are compared with experiment. A solid phase change point is identified. The polar shock for the second phase was calculated. On verification, boron shows two phases, the polars of which are given.

N82-27702/1 PC **A02**/MF **A01**
Sheffield Univ. (England). Dept. of Control Engineering.
The Influence of Vapour Capacitance on the Composition Dynamics of Packed Distillation Columns.
J. B. Edwards, and M. Guilandoust. Nov 81, 17p RR-166

A general transfer function matrix (TFM) expression is derived for the composition dynamics of ideal packed columns that are statically symmetrical, but are dynamically asymmetric, i.e., having a nonunity vapor/liquid capacitance ratio, c. For the special case of c = o, the system TFM is derived completely analytically to produce a parametric TFM, resembling that for c = 1. The result is successfully tested at high and zero frequencies against the initial and final values of the system step responses determined analytically and by time domain simulation. Complete inverse Nyquist diagrams are presented and compared with the c = 1 case. It is noted that whereas for c = 1, the system response for long columns is nonminimum phase, for c = o, the system behaves in a nonstrictly proper fashion with an abrupt initial negative response of magnitude similar to the nonminimum phase dip produced when c = 1. Hence, the variation of c does not greatly influence the general response characteristics of packed columns.

N82-27703/9 PC **A03**/MF **A01**
Sheffield Univ. (England). Dept. of Control Engineering.
The Calculation and Interpretation of Parametric Transfer Functions for Binary Distillation Columns of the Tray Type.
J. B. Edwards, and M. H. N. Tabrizi. Feb 82, 34p RR-169

A transfer function matrix model for long, symmetrical, binary distillation columns was derived completely analytically from assumptions for dynamic analysis. The model relates twin output composition changes to perturbations in the internal liquid and vapor flow rates. The model is intended for use in controller design and, being expressed in terms of plant parameters and operating conditions, provides useful common ground between control engineer and plant designer. Though derived precisely for a symmetrical plant, the model applies more generally as a good approximation. Experimental data is given supporting this claim. Inverse

Nyquist loci are generated in precise and approximate form and shown to compare favorably with computed step responses. The responses accord broadly with previous, part empirical, part numerical research results.

N82-27867/2 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Calculation of Composition Distribution of Ultrafine Ion-H2O-H2SO4 Clusters Using a Modified Binary Ion Nucleation Theory.
J. J. Singh, A. S. Smith, L. Y. Chan, and G. K. Yue. Jun 82, 24p L-1533, NAS1.60:2031, NASA-TP-2031

Thomson's ion nucleation theory was modified to include the effects of curvature dependence of the microscopic surface tension of field dependent, nonlinear, dielectric properties of the liquid; and of sulfuric acid hydrate formation in binary mixtures of water and sulfuric acid vapors. The modified theory leads to a broadening of the ion cluster spectrum, and shifts it towards larger numbers of H2O and H2SO4 molecules. Whether there is more shifting towards larger numbers of H2O or H2SO4 molecules depends on the relative humidity and relative acidity of the mixture. Usually, a broadening of the spectrum is accompanied by a lowering of the mean cluster intensity. For fixed values of relative humidity and relative acidity, a similar broadening pattern is observed when the temperature is lowered. These features of the modified theory illustrate that a trace of sulfuric acid can facilitate the formation of ultrafine, stable, prenucleation ion clusters as well as the growth of the prenucleation ion clusters towards the critical saddle point conditions, even with low values of relative humidity and relative acidity.

N82-28139/5 PC **A04**/MF **A01**
Polish Academy of Sciences, Warsaw.
Nucleation of Phase Transitions in Systems of Asymmetric Particles.
A. Ziabicki, and L. Jarecki. 1982, 74p ISSN-0208-5658
Contract NSF INT-76-17522

The physical sense of the basic parameters of nucleation theory are reexamined with reference to the fundamentals of phenomenological and statistical thermodynamics. Topics covered include: the discrete theory of nucleation in dilute systems of symmetric particles; orientable particles and the effects of their orientation on nucleation kinetics and thermodynamics; the orientation distribution of crystals vs. amorphous elements; and eqilibrium concenration in cluster growth reactions and the chemical potential of cluster growth.

PB82-246703 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC.
Journal of Research of the National Bureau of Standards. Volume 87, Number 2, March-April 1982.
Bi-monthly rept.
1982, 46p
See also PB82-246711 through PB82-246737, Volume 86, Number 5, PB82-140575 and Volume 86, Number 3, PB81-220899. Library of Congress catalog card no. 63-37059.

Contents:
- Calculations of aqueous solubility of organic compounds;
- Enthalpy and heat-capacity standard reference material:
- synthetic sapphire (alpha-Al2O3) from 10 to 2250 K. Buoyant convection computed in a vorticity, stream-function formulation.

PB82-246711
(Order as PB82-246703, PC **A02**/MF **A01**)
National Bureau of Standards, Washington, DC.
Calculation of Aqueous Solubility of Organic Compounds,
Yadu B. Tewari, Michele M. Miller, and Stanley P. Wasik. 26 Aug 81, 4p
Included in Jnl. of Research of the National Bureau of Standards, v87 n2 p155-158, Mar-Apr 82.

No abstract available.

PB82-246729
(Order as PB82-246703, PC **A02**/MF **A01**)
National Bureau of Standards, Washington, DC. National Measurement Lab.
Enthalpy and Heat-Capacity Standard Reference Material: Synthetic Sapphire (Alpha-Al2O3) from 10 to 2250 K,
D. A. Ditmars, S. Ishihara, S. S. Chang, G. Bernstein, and E. D. West. 14 Oct 81, 5p
Prepared in cooperation with Calorimetrics, Inc., Boulder, CO.
Included in Jnl. of Research of the National Bureau of Standards, v87 n2 p159-163, Mar-Apr 82.

No abstract available.

PB82-248899 PC **E08**/MF **E08**
Water Research Centre, Stevenage (England).
The Application of High-Resolution Gas Chromatography to Water Analysis,
Ivana Wilson, and I. Davis. c1981, 120p TR-168

The chief aim of this report is to show the value of HR-GC and to show those water laboratories which decide to use it how to avoid unnecessary problems. Chapters 2 and 3 should help the analyst to choose the most suitable column and instrument; Chapter 4 then describes the main operational aspects of HR-systems using direct solvent injection and glass WCOT columns. Such a system has been introduced and developed for routine use in water laboratories by Professor K. Grob (EAWAG, Switzerland) and, as an outcome of his work, similar systems have been adopted by many laboratories in several countries. Chapter 4 is based on WRC experience with this system. Chapter 5 reviews some applications of HR-GC to water analysis. It also outlines the possibilities of future trends in the application of HR-GC in the water industry. The report is intended for analysts with some experience in gas chromatography and familiar with the basic terms and theory. More specific terms and theory are dealt with where necessary. Evaluation of column performance (Section 2.1), although equally applicable to packed columns, is considered in more detail owing to its practical importance.

PB82-248907 PC **E07**/MF **E07**
Water Research Centre, Stevenage (England).
The Determination of Arsenic and Selenium in Raw and Potable Waters by Hydride Generation/Atomic Absorption Spectrometry - A Review,
A. M. Gunn. c1981, 79p TR-169

The methodology of the hydride AAS technique has become extremely complex and in consequence it can be difficult to assess accurately the effects of individual factors on the determination, and to select the most suitable procedure for a particular purpose. The WRC at present has a requirement for the establishment of hydride/AAS procedures for As and Se determination for its own needs and the primary aim of carrying out the review was to identify that method (or combination of methods) most likely to give the desired performance with the minimum of difficulty. The report is arranged in three main sections: Section 3, in which the apparatus used in both manual and automated hydride/AAS systems is discussed; Section 4, which deals with the selection of reagents and conditions for effecting hydride generation; and Section 5, in which the performance attainable with the various systems reported in the literature is reviewed with regard to the required precision and bias targets presented in Section 1.1. As the range of procedures which have been employed is extremely wide, a brief preliminary classification of these is also included.

PB82-253220 PC **A02**/MF **A01**
British Carbonization Research Association, Chesterfield (England).
The Viscosity of Pitch at Elevated Temperatures. Part 1; Coke-Oven Binder Pitches.
Carbonization research rept. (Final).
Dec 78, 22p CARBONIZATION/RR-61

The viscosities of coke-oven binder pitches over the range 170 to 400C were measured using a Brookfield Synchro-Lectric LVT viscometer. In order to minimize frothing, the pitches were first dried in a dessicator then held at 150 or 230C overnight prior to commencement of measurements. A rise in viscosity at higher temperatures was related to the increase of quinoline-insolubles and toluene-insolubles formed from tar-oils in the pitches and consequently the onset of increasing pseudoplastic behaviour. The tendency of a pitch to exude on heating was best minimized when 20 to 30 per cent of the insolubles was achieved.

PB82-254053 PC **A10**/MF **A01**
Oak Ridge National Lab., TN.
Nonvolatile Organics in Disinfected Wastewater Effluents: Chemical Characterization and Mutagenicity,
Rept. for Jan 77-Mar 81,
R. L. Jolley, R. B. Cumming, N. E. Lee, L. R. Lewis, and J. E. Thompson. Mar 82, 208p EPA-600/2-82-017

Principal objectives of this research program were to examine the effects of disinfection by chlorine, ozone, and ultraviolet light irradiation on nonvolatile organic constituents in secondary effluents relative to chemical effects and formation of mutagenic substances. In a comparative study of effluents from nine wastewater treatment plants, it was determined that disinfection with chlorine or ozone both destroys and produces nonvolatile organic constituents including mutagenic constituents. The chemical effects of disinfection by uv-irradiation were relatively slight although in one effluent, mutagenic constituents were eliminated by uv-irradiation. The investigation utilized the following methodology: concentration of effluents by lyophilization; high-pressure liquid chromatographic (HPLC) separation of nonvolatile organic constituents in effluent concentrates using uv-absorbance, cerate oxidation, and fluorescence detection; bacterial mutagenicity testing of concentrates and chromatographic fractions; identification and characterization of nonvolatile organic constituents in mutagenic HPLC fractions. No compounds known to be mutagens were identified in the mutagenic HPLC fractions separated from the undisinfected, chlorinated and ozonated effluent concentrates. The mutagenic activity of the nonvolatile organic constituents in one chlorinated effluent concentrate was not attributable to organic chloramines.

PB82-260944 PC **A06**/MF **A01**
North Carolina State Univ. at Raleigh. Dept. of Chemical Engineering.
Rates and Equilibria of Devolatilization and Trace Element Evolution in Coal Pyrolysis.
Final rept. Sep 79-Jun 81,
R. M. Felder, C-C Kau, J. K. Ferrell, and S. Ganesan. Apr 82, 103p EPA-600/7-82-027
Contract EPA-CR-804811

The report gives results of using a laminar-flow furnace to study the kinetics of devolatilization and evolution of S, As, Pb, and Hg in the pyrolysis of pulverized coal in nitrogen. Variables included pyrolysis time, reactor temperature, and coal type. Devolatilization rates and weight losses of the two subbituminous coals tested were lower than those of a bituminous coal. The four elements were released in significant quantities during rapid pyrolysis, with the elemental loss from the bituminous coal proceeding more rapidly and to a greater extent than that from the subbituminous coals. Emissions of As and Pb in subbituminous coal and Pb in bituminous coal were found to be proportional to the total volatile matter released. Emissions of Hg and As in bituminous coal were proportionately greater than the total volatile matter released. The S released was proportional to the amount of dry-ash-free volatile matter released for both coals. Five kinetic models for devolatilization were tested.

PB82-874108 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Gel Permeation Chromatography. 1970-August, 1982 (Citations from the NTIS Data Base).
Rept. for 1970-Aug 82.
Aug 82, 131p
Supersedes PB82-854860.

This bibliography contains citations concerning the applications of gel permeation chromatography to the analysis, identification, separation, and characterization of a wide variety of chemical compounds. Topics include the determination of molecular weights and composition of complex mixtures. Instrumentation and operational techniques are also included. (This updated bibliography contains 98 citations, 10 of which are new entries to the previous edition.)

8. EARTH SCIENCES AND OCEANOGRAPHY

8A. Biological Oceanography

PB82-250440 PC **A04**/MF **A01**
Delta Inst. for Hydrobiological Research, Yerseke (Netherlands).
Scientific Market on Mutual Assistance and Cooperation (2nd) Held at Yerseke, Netherlands on 24-26 April 1979: Long-Term Effects of Hydro- and Geobiological Processes in Lagoons and Estuaries,
E. K. Duursma, and C. Myttenaere. 1979, 51p SM-2
Spoonsored in part by Commission of the European Communities, Brussels (Belgium). Directorate-General for Research, Science and Education.
Customers in the European Community countries should apply to the Office for Official Publications of the European Communities, B.P. 1003, Luxembourg.

A document is prepared on the 2nd Scientific Market, held in Yerseke at the Delta Institute for Hydrobiological Research from 24-26 April 1979. The market had as objective to encourage mutual assistance and cooperation between experienced scientists of different disciplines in the field of biology, chemistry, geology, mathematics, pollution (general and radioactive) directed to problems of estuaries and lagoons.

PB82-252446 PC **A03**/MF **A01**
National Park Service, Atlanta, GA. Southeast Regional Office.
Summary of the Loggerhead Sea Turtle Research Project Conducted at Canaveral National Seashore, Cumberland Island National Seashore, Cape Lookout National Seashore: A Final Report.
Research/Resources Management rept.,
D. L. Stoneburner. Jan 81, 36p R/RM/SER-39

A two-year investigation of sea turtle nesting was conducted at three national seashores, Cape Lookout (North Carolina), Cumberland Island (Georgia), and Cape Canaveral (Florida) by the National Park Service, U.S. Department of the Interior. Virtually all nesting was by loggerhead sea turtles, Caretta caretta, a species listed as threatened under the provisions of the Endangered Species Act. Population estimates of the number of nesting female loggerheads for each park are given. Data on tagging, nesting, nest predation, number of hatchlings, and other variables are also presented for each of the three national seashores.

PB82-253105 PC **A03**/MF **A01**
National Marine Fisheries Service, Miami, FL. Southeast Fisheries Center.
A Report on the Available Economic Data for the Invertebrate Fisheries (Except Shrimp).
Technical memo.,
John Ward. May 82, 30p NOAA-TM-NMFS-SEFC-88, NOAA-82071902

An inventory is presented of the existing economic data useful in the analysis of the invertebrate resources except shrimp within the Southeastern Region. The actual list inventorying existing data is outlined. This inventory describes the available data and provides representative examples.

PB82-255092 PC **A03**/MF **A01**
Woods Hole Oceanographic Institution, MA.
Report of the Fisheries Ecology Meeting, June 8-11, 1981.
Technical rept.,
Brian Rothchild, Colin Clark, Richard Hennemuth, Reuben Lasker, and Michael Sissenwine. Jun 82, 41p WHOI-82-28, NOAA-82070603
Grant NA81AA-A-01291

An Ad Hoc Group of the Ocean Sciences Board of the Assembly of Mathematical and Physical Sciences, National Research Council held a Fisheries Ecology Meeting at Woods Hole, June 8-11, 1981. The meeting reached a consensus on the following points: (1) Large and often unexpected fluctuations in fish population abundance are commonplace; (2) Understanding, predicting, and perhaps, to some extent, controlling these fluctuations is one of the most important problems facing fishery managers; (3) While important scientific advances have been made in understanding the relative roles of 'on the average' behavior of fishing mortality, stock, size and recruitment, there remain substantial critical problems in forecasting year-to-year changes in stock size and, in particular, the dynamic interactions among species.

8B. Cartography

AD-A117 409/3 PC **A03**/MF **A01**
Dayton Univ., OH. Research Inst.
The Roughness Lengths Associated with Regions of Heterogeneous Vegetation and Elevation.
Final rept. 1 Oct 80-31 Mar 81,
Charles D. MacArthur, and Patrick A. Haines. May 82, 41p ERADCOM/ASL-CR-82-0206-1
Contract DAAD07-80-D-0206

Algorithms for calculating seasonal roughness lengths from digitized descriptions of surface vegetation and man-made objects are described. The 'monthly characteristic vegetation roughness' for a one square kilometer plat is a log average of 100 roughness lengths, which correspond to the vegetation codes. Seasonal histograms for each square kilometer were also computed. The concept of a roughness length due to changes in elevation is used to derive an algorithm for its calculation. Both algorithms were used to compute roughness lengths for two regions of Central Europe. Region A contained 12,000 square kilometers of elevation and vegetation data at 100 meter intervals. Both types of roughness length were calculated for this region. Region B contained nearly 400,000 square kilometers of elevation data at a 63.5 meter interval. Region B includes region A. In region B only roughness lengths due to elevation change were calculated. The calculated vegetation and elevation roughness lengths in region A were compared. The elevation roughness lengths are generally greater than those due to vegetation in hilly country. The elevation roughness lengths of region A and region B were also compared. It is concluded that the elevation roughness algorithms are sensitive to the horizontal interval between data points.

AD-A117 498/6 PC **A02**/MF **A01**
Defense Mapping Agency Aerospace Center, St. Louis AFS, MO.
Measuring the Fractal Dimensions of Empirical Cartographic Curves,
Mark C. Shelberg, Harold Moellering, and Nina Lam. 1982, 13p

This paper discusses an algorithm, which simulates walking a pair of dividers along a curve, used to calculate the fractal dimensions of curves. It also discusses the choice of chord length and the number of solution steps used in computing fracticality. Results demonstrate the algorithm to be stable and that a curve's fractal dimension can be closely approximated. Potential applications for this technique include a new means for curvilinear data compression, description of planimetric feature boundary texture for improved realism in scene generation and possible two-dimensional extension for description of surface feature textures.

AD-A117 510/8 PC **A06**/MF **A01**
Technische Univ., Graz (Austria). Inst. for Applied Geodesy and Photogrammetry.
Registration of Digitized Aerial Photography with a Digital Map Data Base.
Final rept. Oct 79-Jan 82,
Franz W. Leberl, and Hubert Ranziger. 15 Jan 82, 105p
Contract DAJA37-80-C-0020

This report investigates the feasibility of automatic registration of a digital aerial image with an existing map data bank. The geometry of an aerial image can be modelled mathematically by a central perspective. The theoretical part presents the background of this model and discusses various strategies to solve the problem of resection in space. We propose a method to automatically recognize areal features of the map in the image and to extract control points for the reconstruction of the imaging configuration. Recognition is done by three algorithms: by correlation, by thresholding and by adaption of a binary mask. Results give estimates for the distance of projected features from actual objects, dislocations caused by variation of the transformation parameters and include experiments performed with an actual aerial photograph. (Author)

AD-A117 530/6 PC **A02**/MF **A01**
Defense Mapping Agency Aerospace Center, St. Louis AFS, MO.
Standardization of Map Symbology,
Robert P. Jacober, Jr. Jun 82, 7p

In order to effectively communicate, man must have a common language. In the conventional or digital cartographic sphere, this axiom is no less true. Symbols form the language of cartography. Ideally, a worldwide standard set of symbols would solve many of the communication problems. But, this ideal solution is not technically feasible. However, within scale families of maps, standard symbology should be sought, especially in computer cartographic applications. This paper addresses the need for a standard for map symbology, particularly large scale maps, and suggests such a standard. (Author)

PB82-873217 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Surveying Instruments and Systems. 1976-August, 1982 (Citations from the International Information Service for the Physics and Engineering Communities Data Base).
Rept. for 1976-Aug 82.
Aug 82, 98p

This bibliography contains citations concerning surveying instruments and systems. Topics include geophysical techniques and equipment, distance measurement, radionavigation, radioastronomical techniques, measurement errors, and cartography. Laser surveying technology, computer graphics, inertial surveying systems, measuring instruments, error analysis and control, earth resources survey, and oceanographic surveying are discussed. (Contains 88 citations fully indexed and including a title list.)

8C. Dynamic Oceanography

AD-A117 374/9 PC **A03**/MF **A01**
JAYCOR, Alexandria, VA.
Elliptic Equation Solvers for NORDA Ocean Models and a Study of Equatorial Ocean Dynamics.
Final rept. 25 Nov 80-24 Nov 81,
Alan J. Wallcraft. 2 Jun 82, 43p Rept no. J206-82-001/6204
Contract N00014-81-C-0085

Numerical experiments were performed in order to examine the generating mechanisms for equatorial Rossby solitons. It was shown that wind events representing a relaxation of the equatorial trades can generate these solitary waves subsequent to the reflection of the Kelvin wave from the eastern boundary. If the duration of the event is greater than one month, it is possible for multiple solitons to form. This is particularly true for large scale events like El Nino. The numerical calculations support the hypothesis of Boyd (1980) that solitons would most likely be generated during El Nino events. These results also suggest that even wind events on a smaller scale, both temporally and spatially, can generate Rossby solitons and that these waves may have a significant influence on the variability of the equatorial thermocline. (Author)

AD-A117 383/0 PC **A06**/MF **A01**
Louisiana State Univ., Baton Rouge. Coastal Studies Inst.
A Collection of Reprints,
S. A. Hsu, S. P. Murray, J. M. Coleman, H. H. Roberts, and M. Salama. Jul 82, 114p Rept nos. TR-337, TR-338
Contract N00014-75-C-0192
Includes Rept. nos. TR-339 through TR-342. Pub. in various Jnls. 1982.

Contents: On the Correction of Land-Based Wind Measurements for Oceanographic Applications; Eddy Currents and Sediment Transport Off the Damietta Nile; Fluid Mud Dynamics and Shoreline Stabilization -- Louisiana Chenier Plain; Analysis and Interpretation of TIROS-N AVHRR Infrared Imagery, Western Gulf of Mexico; Periodic Mudflat Progradation, Northeastern Coast of South America -- A Hypothesis; Physical Processes and Fine-Grained Sediment Dynamics, Coast of Surinam, South America.

AD-A117 662/7 PC **A99**/MF **A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS.
Atlantic Coast Hindcast, Phase II, Wave Information.
Final rept..
W. D. Corson, D. T. Resio, R. M. Brooks, B. A. Ebersole, and R. E. Jensen. Mar 82, 1179p

Phase II wave data have been computed for points in a spherical orthogonal grid which covers a section of the North Atlantic Ocean. Although wave data were hindcast for locations throughout this area, primary interest is in the area adjacent to the U.S. Atlantic coast. Thirty-three locations (stations) have been selected for data analysis. The 33 stations have 20 years (1956-1975) of hindcast, significant wave data (height, period, and direction) stored at 3-hr intervals. Waves generated from tropical storms were excluded in the analyses of this report. Water levels and wave heights from tropical storms will be analyzed in a separate section of the ACWIS. The purpose of this report is to present various analyses of the ACWIA Phase II hindcast, significant wave data. This report is similar in format to WIS Report 2. In fact, portions of the text are identical since both reports describe similar types of products.

AD-A117 699/9 PC **A04**/MF **A01**
Woods Hole Oceanographic Institution, MA.
A Compilation of Moored Current Meter Data, White Horse Profiles and Associated Oceanographic Observations. Volume XXIX (Index, 1979).
Technical rept.,
Ellen Levy, Ann Spencer, Gerald Needell, Gretchen Hund, and James R. Luyten. Apr 82, 52p Rept no. WHOI-82-16
Contract N00014-76-C-0197, Grant NSF-ATM78-21491
Includes 5 microfiche inserts. See also volume 26, AD-A117 081.

Current and temperature measurements are presented from instruments deployed during March and April of 1979 in the western Indian Ocean, between 46 deg E. and 62 deg E and between 4 deg S and 4 deg N. The experiment was part of the INDEX program. Twelve mooring sites were occupied. A total of thirty current meters were on WHOI moorings at ten of the sites. An experimental inverted echo sounder was on another WHOI mooring, and a French mooring was at the twelfth site. Most of the resulting data records are of fourteen months duration. A current profiler, the White Horse, was also used, and forty-one profiles were taken over a thirteen-week period. Basic data from the current meters are presented in statistical tables and graphically as scatter plots, progressive vector plots, spectral plots and time series plots. Filtered time series are shown in composite displays. Time series plots are shown for the inverted echo sounder. Basic White Horse data are presented as east and north velocity component profiles , potential temperature and salinity profiles, and potential temperature versus salinity diagrams. (Author)

AD-A117 843/3 PC **A03**/MF **A01**
Stanford Univ., CA. Center for Radar Astronomy.
The Observation of Ocean Surface Phenomena Using Imagery from the SEASAT Synthetic Aperture Radar: An Assessment,
John F. Vesecky, and Robert H. Stewart. 24 Mar 81, 34p
Contract N00014-75-C-0356
Pub. in Jnl. of Geophysical Research, v87 nC5 p3397-3430, 30 Apr 82.

No abstract available.

AD-A117 936/5 PC **A06**/MF **A01**
Washington Univ., Seattle. Applied Physics Lab.
Arctic Oceanographic Measurements: 1978-1980,
Technical rept.
G. R. Garrison, J. T. Shaw, and M. L. Welch. Jun 82, 106p Rept no. APL-UW-8112
Contracts N00123-77-C-1013, N00024-81-C-6042

The field measurements during three arctic expeditions are summarized. In 1978 a research station was established on the ice in the central Chukchi Sea and measurements of temperature, salinity, and current were taken in the water column. In 1979 a station was established on the ice in Kane Basin, north of Thule, Greenland, and temperature and salinity profiles were obtained. Ice temperature was monitored at several depths near the camp.

N82-27953/0 PC **A07**/MF **A01**
National Research Inst. for Oceanology, Stellenbosch (South Africa).
Tables for the Application of Vocoidal Water Wave Theory.
D. H. Swart. Jan 81, 130p CSIR-T/SEA-8010

The determination of wave period for a given wavelength is discussed. Combined shoaling and refraction are considered. Calculation of wave characteristics with vocoidal theory is provided. Time and space dependent vocoidal functions are discussed. Hyperbolic functions are also discussed.

N82-27954/8 PC **A05**/MF **A01**
National Research Inst. for Oceanology, Stellenbosch (South Africa).
The Effect of Bed Slope on Wave Characteristics.
R. C. Nelson. Jun 81, 94p CSIR-RR-372

An experimental program designed to assess and to quantify the influence of slope on the characteristics of nonbreaking waves is described. Slopes as small as 0.015 can have a marked influence on wave characteristics, and that for slopes less than or equal to 0.100 these influences can be described by simple functional relationships.

PB82-252693 PC **A03**/MF **A01**
Technische Hogeschool, Delft (Netherlands). Onderafdeling der Wiskunde en Informatica.
The Numerical Computation of Residual Currents,
N. Praagman. 1981, 36p 81-16

In this report models for the numerical computation of residual flow in coastal seas are studied. A comparison of the models is made based on reliability and computational effort. Results of computations are given, both for situations with and without surface forces (wind).

8D. Geochemistry

DE82701490 MF **A01**
CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Service d'Etudes Analytiques.
Multidimensional Study of the Trace Elements in the American South Western Prophyry Copper Type Deposits: Mineralogy of Uranium.
F. Cesbron, and N. Drin. Sep 81, 110p CEA-R-5118
In French.
U.S. Sales Only. Available in microfiche only.

The use of the spark source mass spectrometry and data treatment methods (principal component analysis and discriminent analysis) allow to describe the trace elements comportments in the porphyry copper type deposits of Arizona (USA) and Sonora (Mexico). The chemical elements are studied in relationship with the alteration zones of these deposits. A electronic microprobe study specifies the uranium bearing minerals. (Atomindex citation 13:661359)

8E. Geodesy

AD-A117 809/4 PC **A02**/MF **A01**
Naval Research Lab., Washington, DC.
Load Numbers, Solid Earth Tides, and Liquid Core Dynamics.
Final rept.,
Paolo Lanzano. 20 Jul 82, 20p Rept no. NRL-8624
See also AD-A088 089.

This report presents in a systematic and rigorous way procedures suitable for the numerical evaluation of the Earth's spheroidal deformations, which most commonly are called the Earth's tides. For this purpose, we: (a) study the Boussinesq theory for the elastic deformations of a flat plate and show how by applying the Boussinesq solution to the tangent plane at a loading point of the spheroidal Earth we can establish the asymptotic behavior of the load numbers (2); (b) elaborate on certain numerical procedures which seem to be best suited for the summation of series once the asymptotic behavior of their coefficients has been ascertained; (c) provide in tabular form the closed form expressions of those infinite series of spherical harmonics which are essential for the numerical evaluation of the Earth's tides; and (d) examine the dynamics of a liquid core for a nonrotating Earth to mathematically prove the existence of a boundary layer at the top of the liquid core. This layer provides a justification for the discontinuous behavior of some of the integration variables at the liquid core/solid mantle interface, and furnishes the proper number of free parameters for satisfying the boundary conditions at the loaded surface. (Author)

AD-A117 837/5 PC **A03**/MF **A01**
Naval Surface Weapons Center, Dahlgren, VA.
Evaluation of Geodetic Products Produced by the NSWC Reduction of SEASAT Radar Altimeter Data.
Final rept.,
Samuel L. Smith, III , and Thomas I. Hicks. Jun 81, 36p Rept no. NSWC/TR-81-260

An estimation is made of the possible errors associated with the processing by NSWC of raw SEASAT altimetry data to produce ocean geodetic data, e.g. geoid heights and vertical deflections. Also the noise level of the SEASAT radar altimetry is estimated. Then the SEASAT geodetic data are examined for self-consistency on repeat-track sequences and compared with other independent geodetic data obtained from ocean gravity surveys by ships. Anomalies in the comparisons are examined to determine probable causes. (Author)

AD-A117 910/0 PC **A02**/MF **A01**
Naval Surface Weapons Center, Dahlgren, VA.
Mean Earth Ellipsoid Determined from SEASAT Altimeter Observations.
Final rept.,
Gladys B. West. Sep 81, 21p Rept no. NSWC-TR-252

The radius and the origin of a mean-earth ellipsoid have been determined from SEASAT satellite radar altimeter observations of the ocean surface and potential coefficients. Assuming that the altimetric geoid is the best available, adjustments are made to the geoid derived from potential coefficients so that the geoid height differences are minimized. A least-squares fitting procedure based on mean geoid heights in 5 degrees x 5 degrees areas was used in the determination of the ellipsoidal parameters. Solutions from two different sets of altimetric geoid heights and geoid heights derived from potential coefficients gave a mean-earth ellipsoid with radius, a = 6378134.9 m and origin shifts less than 1 m in the x and y components and approximately -2.5 m in the z component. (Author)

8F. Geography

AD-A117 804/5 PC **A04**/MF **A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS. Environmental Lab.
Preliminary Guide to the Onsite Identification and Delineation of the Wetlands of the North Atlantic United States.
Final rept.,
Robert Terry Huffman, Gary E. Tucker, Jean W. Wooten, Charles V. Klimas, and Mike W. Freel. May 82, 59p Rept no. WES-TR-Y-78-8
Report on Dredging Operations Technical Support Program.

This guide to the major plant associations and communities found in wetland within the North Atlantic region of the United States is one of a series of eight such guides, each prepared by a specialist or specialists familiar with the wetlands in the region coverd by the guide. The guides are intended for distribution to the various U.S. Army Engineer Districts for use in the onsite technical identification and delineation of wet-

land boundaries. The classification system in this guide is adapted from that utilized by the National Wetland Inventory (NWI) Project of the U.S. Fish and Wildlife Service, but frequently departs from NWI's system to describe common and/or distinct wetland communities or associations. (Author)

AD-A117 846/6 PC **A04**/MF **A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS. Environmental Lab.
Preliminary Guide to the Onsite Identification and Delineation of the Wetlands of the South Atlantic United States.
Final rept.,
Robert T. Huffman, Gary E. Tucker, Jean W. Wooten, Charles V. Klimas, and Mike W. Freel. May 82, 65p Rept no. WES-TR-Y-78-7

This guide to the major plant associations and communities found in wetlands within the South Atlanic region of the United States is one of a series of eight such guides, each prepared by a specialist or specialists familiar with the wetlands in the region covered by the guide. The guides are intended for distributions to the various U. S. Army Engineer Districts for use in the onsite technical identification and delineation of wetland boundaries. The classification system in this guide is adapted from the utilized by the National Wetland Inventory (NWI) Project of the U. S. Fish and Wildlife Service, but frequently departs from NWI's system to describe common and/or distinct wetland communities or associations.

AD-A117 87478 PC **A04**/MF **A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS.
Preliminary Guide to the Onsite Identification and Delineation of the Wetlands of the Interior United States.
Final rept.
May 82, 55p Rept no. WES-TR-Y-78-6

This guide to the major plant associations and communities found in wetlands within the Interior region of the U. S. is one of a series of eight such guides, each prepared by a specialist or specialists familiar with the wetlands in the region covered by the guide. The guides are intended for distribution to the various U. S. Army Engineer Districts for use in the onsite technical identification and delineation of wetlands.

8G. Geology and Mineralogy

AD-A117 712/0 PC **A05**/MF **A01**
Teledyne Geotech, Alexandria, VA. Seismic Data Analysis Center.
Q of the Earth in the 0.5-10Hz Band.
Technical rept.,
Z. A. Der, D. W. Rivers, T. W. McElfresh, A. O'Donnell, and P. J. Klouda. 16 Oct 81, 100p SDAC-TR-81-11, VSC-TR-82-7
Contract F08606-79-C-0007, ARPA Order-2551

The study of spectral characteristics of short period body waves using a worldwide data set indicates that the high frequency fall-off rates of body wave spectra correlate with the tectonic regime of the upper mantle structures traversed. The study also shows, in a consistent manner, that this is due to lateral variations of omega in the mantle. The magnitude of the worldwide omega variations in the mantle is of the same order as that previously observed for the United States. The internal consistency of the observations is such that crustal and site effects and instrument nonlinearity can be ruled out as factors significantly affecting the t estimates obtained.

DE82011112 PC **A06**/MF **A01**
New Mexico Univ., Albuquerque.
Field Examination of Shale and Argillite in Northern Nye County, Nevada.
J. R. Connolly, L. A. Woodward, K. M. Emanuel, and K. Keil. Dec 81, 124p SAND-81-7154
Contract AC04-76DP00789
Portions of document are illegible.

Thirty-two locales underlain by clay-rich strata ranging from Cambrian Pioche Shale to Mississippian Chainman Shale and equivalents were examined in northern Nye County, Nevada. The text of the report summarizes data for each stratigraphic unit examined. Checklists for tabulating field data at each locale are included in an appendix. Working guidelines used to evaluate the locales include a minimum thickness of 150 m (500 ft) of relatively pure clay-rich bedrock, subsurface depth between 150 m (500 ft) and 900 m (3000 ft), low topographic relief, low seismic and tectonic activity, and avoidance of areas with mineral resource production or potential. Field studies indicate that only the Chainman Shale, specifically in the central and northern parts of the Pancake Range, appears to contain sites that meet these guidelines. (ERA citation 07:044857)

DE82011505 PC **A04**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Inventory of Thermal Springs and Wells within a One-Mile Radius of Yucca Lodge, Truth or Consequences, New Mexico.
G. E. Schwab. Feb 82, 73p EGG-2148
Contract AC07-76ID01570
Portions of this report are illegible.

Equity Management Corporation proposes (1) to build about 30 condominiums at the present site of the Yucca Lodge, Truth or Consequences, New Mexico and (2) to heat the condominiums with the natural thermal waters that discharge from the property. To do so the corporation must satisfy the rules and regulations of four state and federal agencies. To satisfy some of the data requirements of these agencies and to provide basic data on the geohydrology of the area this report provides the results of a field inventory of the springs and wells within one mile of the lodge. Table 1 summarizes the data for eight springs and three sites where springs once issued. Table 2 summarizes the data on forty-four operable wells and thirty wells that are unusable in their present condition. Appendices list (1) wells presumed to be in the area but not located during field inspection and (2) wells that could be in the area, but were found to be beyond the one-mile radius. Temperature and specific conductance of the water show only minor variation within the recognized hotwater. (ERA citation 07:046445)

DE82011971 PC **A03**/MF **A01**
Los Alamos National Lab., NM.
Geological and Geophysical Signatures of the Jemez Lineament: A Reactivated Precambrian Structure.
M. J. Aldrich, Jr., M. E. Ander, and A. W. Laughlin. 1981, 35p LA-UR-82-561, CONF-810687-2
Contract W-7405-ENG-36
International conference on basement tectonics, Oslo, Norway, Aug 1981.

The Jemez lineament (N52 exp 0 E) is one of several northeast-trending lineaments that traverse the southwestern United States. It is defined by a 500-km-long alignment of late Cenozoic volcanic fields extending southwest from at least the Jemez Mountains in the north-central New Mexico to the San Carlos-Peridot volcanic field in east-central Arizona. Geochronologic data from Precambrian basement rocks indicate that the lineament is approximately coincident with a boundary between Precambrian crustal provinces. Characteristics of the lineament are high heat flow (>104.5 mW/m exp 2), an attenuated seismic velocity zone from 25 to 140 km depth, and an upwarp of the crustal electrical conductor inferred from magnetotelluric studies. The high electrical conductivity is probably caused by the presence of interstitial magma in the rocks of the mid-to-upper crust. The average electical strike within the Precambrian basement is N60 exp 0 E, supporting a relationship between the Precambrian structural grain and the Jemez lineament. The geological and geophysical data suggest that the lineament is a structural zone that extends deep into the lithosphere and that its location was controlled by an ancient zone of weakness in the Precambrian basement. Ages of late Cenozoic volcanic rocks along the lineament show no systematic geographic progression, thus indicating that a mantle plume was not responsible for the alignment of the volcanic fields. (ERA citation 07:044855)

DE82012424 PC **A06**/MF **A01**
Indiana Geological Survey, Bloomington.
Studies of the New Albany Shale (Devonian and Mississippian) and Equivalent Strata in Indiana.
N. R. Hasenmueller, and G. S. Woodard. Sep 81, 108p DOE/MC/05204-1128
Contract AC21-76MC05204

A formation of black carbonaceous shale, later named the New Albany Shale, was first recognized in 1837 and reported in 1839 by David D. Owen. Since then, the New Albany has been the subject of numerous investigations by individuals affiliated with the Indiana Geological Survey and others. The present comprehensive investigation, involves petrology, mineralogy, stratigraphy, geomorphology, organic and inorganic geochemistry, and physical properties. The lower part of the New Albany Shale is late Middle Devonian in age, and the upper part is Early Mississippian in age.

DE82012730 MF **A01**
Lawrence Livermore National Lab., CA.
Use of gamma Logs to Characterize and Correlate Alluvium in Northern Yucca Flat, Nevada Test Site.
J. L. Wagoner. 1 Oct 81, 27p UCRL-86748, CONF-810884-3
Contract W-7405-ENG-48
Monterey containment symposium, Monterey, CA, USA, 26 Aug 1981, Portions of document are illegible. Best available copy from document source. Available in microfiche only.

Gamma ray logs are used to characterize and correlate alluvium in northern Yucca Flat. Individual beds in the alluvium cannot be correlated over large distances because of abrupt lateral facies changes. Zones of similar gamma ray intensity are identified in the alluvium and can be correlated between boreholes. Variations in gamma intensity is probably a function of source area mineralogy and/or grain size. These stratigraphic zones provide understanding of the deposition patterns and history of the alluvium and can help solve local structural problems in northern Yucca Flat. (ERA citation 07:044870)

DE82780470 MF **A01**
Instituto Militar de Engenharia, Rio de Janeiro (Brazil).
Thorium Content of a Mineral Ore from Morro Do Ferro by Fission Track Technique.
C. A. N. de Oliveira. Oct 80, 73p INIS-mf-6915
In Portuguese.Thesis.
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

The feasibility to determine thorium concentrations by fission track technique in samples of mineral ore has been demonstrated. The literature registers only the application of the fission track technique to mineral ore in the case where the fissionable element is uranium. The technique was applied to determine the thorium concentration of an ore sample from Morro do Ferro, taking advantage of the high thorium to uranium ratio in that mineral. The sample analysed presented a thorium concentration of 2467 +- 400 mg Th/Kg ore. The so called wet method was adopted by using the Bayer made Makrofol KG 10 mu m thick, as the detector foil, immersed in the thorium solution. The technique is also useful to determine thorium concentrations in environmental samples because of the following aspects: high sensitivity; fast chemical separation of interfering elements; low cost; and operational simplicity. (Atomindex citation 13:658453)

PB82-252438 PC **A03**/MF **A01**
Illinois State Geological Survey Div., Champaign.
The Dwight Mineralogical Zone of the Yorkville Till Member, Northeastern Illinois.
Circular rept.,
Myrna M. Killey. 1982, 33p IL/SGS/CIRC-526

A distinct mineralogical component occurs in the upper part of the Yorkville Till Member of the Wedron Formation of Wisconsinan age in northeastern Illinois. This upper unit, here named the Dwight mineralogical zone, exists within the area of, but is not bounded by, the older Marseilles Morainic System and the younger, overriding Minooka Moraine. To identify, compare, and differentiate till of the Dwight mineralogical zone from till of the remainder of the Yorkville Till Member (herein called lower Yorkville), samples from 99 locations were analyzed for matrix grain size, clay mineral composition, carbonate content, and color. The Dwight mineralogical zone is mainly a grayish-brown, silty clay till; it averages 76% illite and has a dolomite-calcite ratio of 2:1. This study confirms the importance of consistent application of analytical laboratory data from subsurface sampling to regional studies for purposes of stratigraphic correlation.

PB82-254236 PC **A03**/MF **A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Office of Marine Pollution Assessment.

Elemental Composition of Suspended Particulate Matter in the Lower Duwamish River and Elliott Bay, Washington.
Technical memo.,
G. J. Massoth, R. A. Feely, and M. F. Lamb. Jun 82, 48p NOAA-TM-OMPA-17, NOAA-82070601

The distribution and trace element compositions of suspended particulate matter in the Duwamish River and Elliott Bay were determined from samples collected in February 1980. The results show significant enrichments of Fe, Cr, Ni, Cu, Zn, and Pb in suspended matter from the Duwamish River estuary which is attributed to flocculation processes. In Elliott Bay the trace-element-enriched particles from the Duwamish River form a narrow plume that flows north across the inner Bay and westward along the northern coast where it eventually disperses into the outer Bay and central basin of Puget Sound.

8H. Hydrology and Limnology

AD-A117 519/9 PC **A03**/MF **A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS. Environmental Lab.
Aquatic Habitat Studies on the Lower Mississippi River, River Mile 480 to 530. Report 8. Summary.
Miscellaneous paper,
Thomas D. Wright. Feb 82, 46p Rept no. WES/MP/E-80-1-8
See also report dated Feb 82, AD-A116 990.

The pilot investigations provided significant guidance in the choice of methods and the experimental design for the long-term effort. In addition to increasing the overall validity of the data, cost savings were also obtained through the use of the most efficient techniques and in the reduction of unneccessary sampling. (Author)

AD-A117 614/8 PC **A08**/MF **A01**
Hydrologic Engineering Center, Davis, CA.
Hydrologic Analysis of Ungaged Watersheds Using HEC-1,
Johannes J. DeVries. Apr 82, 175p Rept no. HEC-TRAINING-15

This report discusses general approaches to frequency analyses for ungaged watersheds, effects of the extent of data availability on choice of approach, and regionalization of hydrologic parameters. Hypothetical rainfall data are often the only rainfall data available for a study, so methods for use of this type of data are presented. The use of HEC-1 for watershed modeling is described, and techniques are given in detail for the estimation and calibration of HEC-1 model parameters. (Author)

AD-A117 627/0 PC **A04**/MF **A01**
Hydrologic Engineering Center, Davis, CA.
Mixed-Population Frequency Analysis.
Preliminary rept.,
Edward C. Morris. Apr 82, 51p Rept no. HEC-TRAINING-17

This training document provides guidance on the development of frequency curves from annual peak discharges that are segregated into two populations. While the procedures contained in this document use annual peaks caused by hurricane and non-hurricane events, the methods apply equally well to events caused by other phenomena such as rainfall and snowmelt. (Author)

AD-A117 657/7 PC **A04**/MF **A01**
Hydrologic Engineering Center, Davis, CA.
Application of the HEC-2 Split Flow Option.
Training document,
Alfredo E. Montalvo. Apr 82, 62p Rept no. HEC-TRAINING-18

The purpose of this training document is to provide information on the capabilities and limitations of the computer program HEC-2 Split Flow option. This document provides a detailed description of the input requirements, output results, computational methods and example applications for the split flow option.

DE82009268 PC **A11**/MF **A01**
Oak Ridge National Lab., TN.
Technical Background Information for the Environmental and Safety Report, Volume 4: White Oak Lake and Dam.
T. W. Oakes, B. A. Kelly, W. F. Ohnesorge, J. S. Eldridge, and J. C. Bird. Mar 82, 249p ORNL-5681
Contract W-7405-ENG-26
Portions of document are illegible.
Microfiche only after original copies are exhausted.

This report has been prepared to provide background information on White Oak Lake for the Oak Ridge National Laboratory Environmental and Safety Report. The paper presents the history of White Oak Dam and Lake and describes the hydrological conditions of the White Oak Creek watershed. Past and present sediment and water data are included; pathway analyses are described in detail. (ERA citation 07:044745)

N82-27907/6 PC **A05**/MF **A01**
Royal Inst. of Tech., Stockholm (Sweden).
On the Description of the Properties of Fractured Rock Using the Concept of a Porous Medium.
J. Stokes. May 80, 90p SKBF/KBS-TR-80-05

In order to describe the flow of groundwater through fractured rock, water is either assumed to flow through a porous continuum or through discrete fractures between impervious blocks of rock. The latter approach being the one demanding more information on the rock, problems on groundwater flow are usually discussed using the porous medium approach. It is essential that after assuming that a certain flow region acts as a porous medium, we use a procedure for measuring the properties that at the same time gives a test of this assumption. When giving a description of groundwater flow, the goal is often a presentation of pathlines and flowtimes between points of interest and the ground surface. Using a porous medium approach, this means that hydraulic conductivity and porosity must be known through the medium. In order to cope with transient flow, we must also know the time constant governing the development of the flow. A conductivity decreasing with depth will force the pathlines to the surface giving local flow. If the conductivity is constant, the flow is regional. It is therefore important to know the gradient of hydraulic conductivity. Finally, the anisotropic structure of the rock must be known in order to describe the flow. In this report a procedure to measure the properties listed above is developed.

PB82-254228 PC **A06**/MF **A01**
National Oceanic and Atmospheric Administration, Ann Arbor, MI. Great Lakes Environmental Research Lab.
Great Lakes Basins Runoff Modeling.
Technical memo.,
Thomas E. Croley, II. Jan 82, 104p NOAA-TM-ERL-GLERL-39, NOAA-82070203

Large-scale watershed models are required to estimate basin runoff to the Great Lakes for use in routing determinations and operational hydrology studies. Data limitations, large-basin applicability, and economic efficiency preclude the use of existing large-watershed models. An interdependent tank-cascade model is described that uses a mass balance coupled with linear reservoir concepts. It is physically based and uses climatological considerations not possible for small watersheds; analytical solutions are employed to bypass numerical inaccuracies. Snowmelt and net supply computations are separable from the mass balance determinations and are based on a simple heat balance. Partial area concepts are used to determine infiltration and surface runoff.

8I. Mining Engineering

DE81022528 PC **A04**/MF **A01**
Hawaii Univ., Honolulu.
Phase III: Well Testing and Analysis. Progress Report for the First Quarter of Federal FY77.
1 Jan 77, 70p DOE/ET/28302-T5
Contract AC03-76ET28302

Management activities during the period are summarized. The following aspects of the geosciences program are reviewed: magnetics; seismic studies; geoelectric studies; petrography, petrology, and geochemistry; hydrology and hydrothermal geochemistry; and physical properties of rocks; and geotoxicology. The engineering program review includes numerical modelling and well testing and reservoir engineering.

DE82004194 PC **A03**/MF **A01**
Alaska Univ., Fairbanks. Mineral Industry Research Lab.
Steam Drying of Subbituminous Coals from the Nenana and Beluga Fields, a Laboratory Study. Final Report, September 1, 1978-February 28, 1981.
P. D. Rao, and E. N. Wolff. 15 Nov 81, 40p DOE/ET/12222-T1
Contract FG01-78ET12222
Portions of document are illegible.

Samples of coal from the Usibelli Coal Mine (numbers 3 and 4 seams) and Waterfall seam of the Beluga Coal Field were dried at 250 exp 0 C and 550 psia of steam pressure for varying lengths of time ranging from 5 to 60 minutes. Loss of weight ranged from 19.18 to 27.8% depending on the size consist of the sample and drying time. A weight reduction of 20% can be achieved with a 5 minute drying time for coals crushed to minus 2". Dried coals were characterized for compressive strength, size stability by drop shatter, Hardgrove Grindability Index, heating value and relation of petrology to drying behavior. The five minute steam drying process can improve heating value by more than 26% and considerably improve the grindability. Although dried coals had considerably lower compressive strength, drying did not affect size stability. Granting that dried coals regained some moisture at 98% relative humidity, weight gained is considerably less than weight lost in drying, providing net benefits due to drying. An apparatus has been designed and fabricated to enable comparison of self heating tendencies of various raw coals and dried products. (ERA citation 07:042200)

DE82006208 MF **A01**
Bendix Field Engineering Corp., Grand Junction, CO.
National Uranium Resource Evaluation. Uranium Hydrogeochemical and Stream Sediment Reconnaissance of the Greeley NTMS Quadrangle, Colorado.
Nov 81, 146p GJBX-265-81
Contract AC13-76GJ01664
Portions of this report are illegible.
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This report presents results of a Hydrogeochemical and Stream Sediment Reconnaissance of the Greeley NTMS quadrangle, Colorado. In addition to this abbreviated data release, more complete data are available to the public in machine-readable form. These machine-readable data, as well as quarterly or semiannual program progress reports containing further information on the HSSR program in general, or on the Los Alamos National Laboratory portion of the program in particular, are available from DOE's Technical Library at its Grand Junction Area Office. Presented in this data release are location data, field analyses, and laboratory analyses of several different sample media. For the sake of brevity, many field site observations have not been included in this volume; these data are, however, available on the magnetic tape. Appendices A through D describe the sample media and summarize the analytical results for each medium. The data have been subdivided by one of the Los Alamos National Laboratory sorting programs of Zinkl and others (1981a) into groups of stream-sediment, lake-sediment, stream-water, and ground-water samples. For each group which contains a sufficient number of observations, statistical tables, tables of raw data, and 1:1,000,000 scale maps of pertinent elements have been included in this report. Also included are maps showing results of multivariate statistical analyses.

DE82007988 MF **A01**
Lawrence Livermore National Lab., CA.
Underground Coal Gasification: A Leading Contender in the Synfuels Industry.
D. R. Stephens. 27 Oct 81, 38p UCRL-53216
Contract W-7405-ENG-48
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Underground coal gasification (UCG) promieses to be a relatively low cost, environmentaly sound method for producing clean fuels from coal deposits that are unattractive for mining. The coal is gasified in place, with the reactions supported by oxygen and steam piped down from the surface. Gases produced by the combustion reactions are piped to the surface, where they can be converted to various useful fuels such as pipeline quality gas or gasoline at costs estimated to be

competitive with those for fuels from conventional sources. Huge deposits of deep coal exist in the US which are not economically recoverable by mining. It appears that a successful UCG process could recover enough of these presently unusable resources to quadruple our coal reserves. Thus there is a strong economic incentive to develop the UCG process. As a further advantage, the UCG process is expected to have only minor environmental impact since the coal is consumed underground and most of the waste products remain there. In the US, an R and D program in UCG has been supported by the Department of Energy and its predecessor agencies for about a decade, and private industry has also been active in developing the process; elsewhere in the world, development programs are being carried on in a number of countries. Results have been very encouraging, and it appears that if government and industry continue to support UCG development, then the UCG process could become commercially established by the 1990s. (ERA citation 07:042109)

DE82008160 PC **A03**/MF **A01**
Department of Energy, Morgantown, WV. Morgantown Energy Technology Center.
Semi-Annual Report for the Unconventional Gas Recovery Program. Volume I. Executive Summary.
Nov 81, 40p DOE/METC/SP-164

This semi-annual report is presented in two separately bound volumes. Volume I, which is the Executive Summary, provides an overview of the Unconventional Gas Recovery projects. Volume II, which is the basic Semi-Annual Report for the Unconventional Gas Recovery Program, describes the four project activities in detail. Both Volumes I and II are divided into the same five major sections: introduction; Methane Recovery from Coalbeds Project; Eastern Gas Shales Project; Western Gas Sands Project; Geopressured Aquifers Project. (ERA citation 07:042349)

DE82008179 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Multiple Fracturing Experiments: Propellant and Borehole Considerations.
J. F. Cuderman. 1982, 13p SAND-81-2224C, CONF-820524-5
Contract AC04-76DP00789
Unconventional gas recovery symposium, Pittsburg, PA, USA, 16 May 1982, Portions of document are illegible.

The technology for multiple fracturing of a wellbore, using progressively burning propellants, is being developed to enhance natural gas recovery. Multiple fracturing appears especially attractive for stimulating naturally fractured reservoirs such as Devonian shales where it is expected to effectively intersect existing fractures and connect them to a wellbore. Previous experiments and modeling efforts defined pressure risetimes required for multiple fracturing as a function of borehole diameter, but identified only a weak dependence on peak pressure attained. Typically, from four to eight equally spaced major fractures occur as a function of pressure risetime and in situ stress orientation. The present experiments address propellant and rock response considerations required to achieve the desired pressure risetimes for reliable multiple fracturing.

DE82008545 MF **A01**
Mechanics Research, Inc., Santa Monica, CA.
Ceramic Vacuum Tubes for Geothermal Well Logging.
R. D. Kelly. Jan 77, 96p DOE/ET/28413-T5
Contract AC03-76ET28413
Portions of document are illegible.
Available in microfiche only.

Useful design data acquired in the evaluation of ceramic vacuum tubes for the development of a 500 exp 0 C instrumentation amplifier are presented. The general requirements for ceramic vacuum tubes are discussed for application to the development of high temperature well logs. Commercially available tubes are described and future contract activities that specifically relate to ceramic vacuum tubes are detailed. Supplemental data are presented in the appendix. (ERA citation 07:043090)

DE82008929 PC **A03**/MF **A01**
Shell Oil Co., New Orleans, LA.
Weeks Island S Sand Reservoir B Gravity Stable Miscible CO sub 2 Displacement, Iberia Parish, Louisiana. Fourth Annual Report, June 1980-June 1981.
G. E. Perry. Apr 82, 43p DOE/ET/12004-5
Contract AC05-77ET12004
Portions of document are illegible.

Shell, in conjunction with the United States of America Department of Energy, is conducting a gravity stable displacement field test of the miscible CO sub 2 process. The test is being conducted in the portion of a fault sealed reservoir lying below a subsea depth of -12,750 feet. Injection of the CO sub 2 slug at the producing gas-oil contact commenced in October 1978. Injection of the 860 MM cubic foot slug was completed in February of 1980. The slug of CO sub 2 was moved downward through the watered out sand by production of downdip water. The leading edge of the displacement has reached the producing perforations and production of the oil column commenced on January 26, 1981. Conventional cores and the log-inject-log technique were used to determine residual oil saturation in a well drilled as the pilot producer. Pulsed neutron logging devices have been used to detect the CO sub 2 slug and monitor its subsequent movements in the vicinity of the production well. The monitor logs indicate the thickness of the oil column had increased during the displacement to the production perforations located 130 feet below the level of CO sub 2 injection. The 23 foot oil column remaining at initiation of the project had apparently grown to 57 feet. PVT samples production data indicate CO sub 2 has penetrated the oil column and free gas is being produced with the oil. However, the qualitative measurements of the logs do not indicate a large gas or CO sub 2 content in the oil column.

DE82009053 PC **A09**/MF **A01**
Colorado State Univ., Fort Collins.
Overburden Characterization and Post-Burn Study at the Hanna, Wyoming Underground Coal Gasification Site: Stratigraphy, Depositional Environments and Mineralogy, Hanna Formation.
G. N. Craig, II, L. K. Burns, F. G. Ethridge, T. Laughter, and A. D. Youngberg. Mar 82, 195p DOE/LC/10496-T1
Contract AT20-80LC10496
Portions of document are illegible.
Microfiche only after original copies are exhausted.

Several underground coal gasification (UCG) experiments have been conducted in the Hanna No. 1 coal seam. During the fall of 1980 the Laramie Energy Technology Center performed a post-burn field study of the Hanna II, Phases 2 and 3 experiment at the Hanna UCG site. The field work consisted of high resolution seismic, drilling, coring, and geophysical logging. The Department of Earth Resources, Colorado State University, contributed to the post-burn study by doing laboratory work on the cores and geophysical logs. The purpose of the laboratory work was to provide an estimate of the temperatures and chemical conditions reached during the conversion experiment by studying the mineralogical and textural characteristics of thermally altered and ualtered overburden. In the vicinity of the burn cavity, overburden rocks have been subjected to high temperature pyrometamorphism during the Hanna II Phases 2 and 3 UCG experiments. Paralava rocks, buchites and paralava breccias containing glass and various high temperature minerals such as oligoclase, clinopyroxene, ferrocordierite, mullite, cristobalite, magnetite, and tridymite formed. Textures of some of these minerals suggest crystallization directly from a melt. Mineralogy and melting relations of the paralavas, ash fusion temperatures, and thermocouple measurements made during the experiment suggest that tempratures in excess of 1200 exp 0 C were attained. Rock color and the presence of reduced iron bearing minerals and blebs of native iron indicate that the experimental burn and the product gases in the area of paralava formation were reducing. (ERA citation 07:045523)

DE82009120 PC **A06**/MF **A01**
Denver Research Inst., CO.
Geothermal-Well Design Handbook.
Feb 82, 103p DOE/ET/27141-4
Contract AI01-79ET27141
Microfiche only after original copies are exhausted.

A simplified process is presented for estimating the performance of geothermal wells which are produced by natural, flashing flows. The well diameter and depth, and reservoir conditions must be known; then it is possible to determine the total pressure drop in a flowing well, and therefore to find the fluid pressure, temperature, and steam quality at the wellhead. By applying the handbook process to several input data sets, the user can compile sufficient information to determine the interdependence of input and output parameters. (ERA citation 07:043127)

DE82009639 PC **E08**/MF**$12.80**
High Life Helicopters, Inc., Puyallup, WA.
Airborne gamma-Ray Spectrometer and Magnetometer Survey, Cleveland Quadrangle (PA,OH), Erie Quadrangle (PA), Warren Quadrangle (PA), And Pittsburgh Quadrangle (PA). Volume 1. Final Report.
1982, 71p GJBX-42-82
Contract AC13-79GJ01692
Includes 50 sheets of 48x reduction microfiche. Portions of document are illegib'ɔ.

Data were collected by a helicopter equipped with a gamma-ray spectrometer with a large crystal volume, and with a high sensitivity proton precession magnetometer. The radiometric system was calibrated at the Walker Field Calibration pads and the Lake Mead Dynamic Test Range. Data quality was ensured during the survey by daily test flights and equipment checks. Radiometric data were corrected for live time, aircraft and equipment background, cosmic background, atmospheric radon, Compton scatter, and altitude dependence. The corrected data were statistically evaluated, plotted, and contoured to produce anomaly maps based on the radiometric response of individual geological units. The anomalies were interpreted and an interpretation map produced. Volume I contains a description of the systems used in the survey, a discussion of the calibration of the systems, the data collection procedures, the data processing procedures, the data presentation, the interpretation rationale, and the interpretation methodology. (ERA citation 07:042383)

DE82009651 MF **A01**
Bendix Field Engineering Corp., Grand Junction, CO.
Uranium Hydrogeochemical and Stream Sediment Reconnaissance of the Howard Pass NTMS Quadrangle, Alaska.
Jan 82, 102p GJBX-8-82
Contract AC13-76GJ01664
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

This report presents results of a Hydrogeochemical and Stream Sediment Reconnaissance (HSSR) of the Howard Pass NTMS quadrangle, Alaska. In addition to this abbreviated data release, more complete data are available to the public in machine-readable form. These machine-readable data, as well as quarterly or semiannual program progress reports containing further information on the HSSR program in general, or on the Los Alamos National Laboratory (LANL) portion of the program in particular, are available from DOE's Technical Library at its Grand Junction Area Office. Presented in this data release are location data, field analysis, and laboratory analyses of several different sample media. For the sake of brevity, many field site observations have not been included in this volume; these data are, however, available on the magnetic tape. Appendices A and B describe the sample media and summarize the analytical results for each medium. The data have been subdivided by one of the Los Alamos National Laboratory sorting programs of Zinkl and others (1981a) into groups of stream-sediment and lake-sediment samples. For each group which contains a sufficient number of observations, statistical tables, tables of raw data, and 1:1,000,000 scale maps of pertinent elements have been included in this report. Also included are maps showing results of multivariate statistical analyses. Information on the field and analytical procedures used by the Los Alamos National Laboratory during sample collection and analysis may be found in any HSSR data release prepared by the Laboratory and will not be included in this report. (ERA citation 07:042378)

DE82009664 MF **A01**
Bendix Field Engineering Corp., Grand Junction, CO.
Uranium Hydrogeochemical and Stream Sediment Reconnaissance of the Tanacross NTMS Quadrangle, Alaska.
Jan 82, 140p GJBX-4-82
Contract AC13-76GJ01664
Portions of document are illegible.

Best available copy from document source. Available in microfiche only.

This report presents results of a Hydrogeochemical and Stream Sediment Reconnaissance (HSSR) of the Tanacross NTMS quadrangle, Alaska. In addition to this abbreviated data release, more complete data are available to the public in machine-readable form. These machine-readable data, as well as quarterly or semiannual program progress reports containing further information on the HSSR program in general, or on the Los Alamos National Laboratory (LANL) portion of the program in particular, are available from DOE's Technical Library at its Grand Junction Area Office. Presented in this data release are location data, field analyses, and laboratory analyses of several different sample media. For the sake of brevity, many field site observations have not been included in this volume; these data are, however, available on the magnetic tape. Appendices A and B describe the sample media and summarize the analytical results for each medium. The data have been subdivided by one of the Los Alamos National Laboratory sorting programs of Zinkl and others (1981a) into groups of stream-sediment and lake-sediment samples. For each group which contains a sufficient number of observations, statistical tables, tables of raw data, and 1:1,000,000 scale maps of pertinent elements have been included in this report. Also included are maps showing results of multivariate statistical analyses. Information on the field and analytical procedures used by the Los Alamos National Laboratory during sample collection and analysis may be found in any HSSR data release prepared by the Laboratory and will not be included in this report. (ERA citation 07:042375)

DE82009666 MF **A01**
Bendix Field Engineering Corp., Grand Junction, CO.
Uranium Hydrogeochemical and Stream Sediment Reconnaissance of the Barter Island NTMS Quadrangle, Alaska.
Jan 82, 14p GJBX-6-82
Contract AC13-76GJ01664
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

This report presents results of a Hydrogeochemical and Stream Sediment Reconnaissance (HSSR) of the Barter Island NTMS quadrangle, Alaska. In addition to this abbreviated data release, more complete data are available to the public in machine-readable form. These machine-readable data, as well as quarterly or semiannual program progress reports containing further information on the HSSR program in general, or on the Los Alamos National Laboratory (LANL) portion of the program in particular, are available from DOE's Technical Library at its Grand Junction Area Office. For the sake of brevity, many field site observations have not been included in this volume; these data are, however, available on the magnetic tape. Appendices A and B describe the sample media and summarize the analytical results for each medium. The data have been subdivided by one of the Los Alamos National Laboratory sorting programs of Zinkl and others (1981a) into groups of stream-sediment and lake-sediment samples. Information on the field and analytical procedures used by the Los Alamos National Laboratory during sample collection and analysis may be found in any HSSR data release prepared by the Laboratory (see, for example, Planner and others, 1981) and will not be included in this report. (ERA citation 07:042376)

DE82011942 PC **A02**/MF **A01**
Monsanto Research Corp., Miamisburg, OH.
Location of Drilling Sites in the Devonian Shales by Aerial Photography.
R. D. McIver, J. R. Kyle, and R. E. Zielinski. 1982, 6p MLM-2915, CONF-820524-7
Contract AC04-76DP00053
Unconventional gas recovery symposium, Pittsburg, PA, USA, 16 May 1982, Portions of document are illegible.

Current estimates of gas in place in the Devonian Shales of the Appalachian Basin range up to 2500 TCF. For the most part, the majority of this resource is tied up in the shale matrix and the source and reservoir of this gas is the same as the low permeability and porosity of the shale prevents migration of the gas to a more classical reservoir rock. Where there is fracturing of the shales the fracture network serves as a reservoir and wells drilled in the area of fracturing tend to be good producers. For exploration purposes, the most probable areas for drilling of the shales are those that have a high density of natural fracturing. Aerial photography has been used to locate potential drilling sites in the Basin. The use of this technique is based upon the premise that fractures evident in surface sediments are often useful indicators of subsurface fracturing favorable for the accumulation of hydrocarbons. Buried fault traps, anticlines, and salt domes are frequently revealed by surface fault configurations or locally anomalous joint orientations. Moreover, since fractures are frequently conduits and collection sites for hydrocarbons, a concentration of surface fractures may indicate a potential productive reservoir at depth. Aerial photography allows fractures to be recognized and mapped in almost every type of terrain and soil cover. A photogeological study designed to aid in the location of specific prospects typically begins with a study of LANDSAT photos to spot large scale features. This is followed by a study of stereoscopic photo pairs and photomosaics of larger scale. The current paper reviews the premise of photogeology, the techniques used in applying aerial photography as an exploration tool and finally the application of photogeology in identifying specific well sites in the Devonian Shales of the Appalachian Basin.

DE82012069 PC **A08**/MF **A01**
Lawrence Livermore National Lab., CA.
Cost Saving Concepts on the Production of Methanol from Underground Gasified Coal.
1981, 163p UCRL-15442
Contract W-7405-ENG-48

This study examines the technical and economic feasibility of using raw gas from an underground coal gasification (UCG) facility as feedstock for methanol synthesis. Special consideration has been given to cost saving concepts in the plant design such as: maximizing the use of sensible heat for gas clean-up; use of aerial heat exchangers to conserve water; low level waste heat recovery for electricity generation; and sale of by-products to offset operating costs. In addition, transfer pricing of the gas is calculated at three points in the process scheme to determine the contribution of various process steps to the final produt price. This study is based upon the design criteria provided by Lawrence Livermore National Laboratory. Three facility sizes are examined, beginning with 12,000 barrels per day (BPD) of fuel grade methanol and including 4000 BPD and 24,000 BPD. The 12,000 BPD facility constitutes the base case design for this study. The site location used as the basis for the study is Sweet Water County, Wyoming. The economic parameters are the same as those developed in Pritchard's previous study for the DOE on UCG gas to methanol and M-Gasoline. (ERA citation 07:042698)

DE82012137 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Measurement of Instantaneous Shut-in Pressure in Crystalline Rock.
L. Aamodt, and M. Kuriyagawa. 1981, 10p LA-UR-82-782, CONF-811240-1
Contract W-7405-ENG-36
Workshop on hydraulic fracturing stress measurements, Monterey, CA, USA, 1 Dec 1981.

A method is defined which was found useful, not only for determining the instantaneous shut-in pressure (ISIP) during fracture creation, but also for determining the pressure inside the fracture, near the exit and entrance wellbores, when a circulation of fluid through a fracture is taking place. The basic assumption of the Muskat method is that, after a short transient period, the shut-in pressure approaches an asymptotic value, Pa, in an exponential fashion, i.e., if Pa is subtracted from P at each time, t, and the result is plotted, ln (P-Pa) vs t will be a straight line. Various values of Pa are tried until the best straight line fit is found. Two Muskat analyses are shown. (ERA citation 07:043129)

DE82012205 PC **A04**/MF **A01**
Science Applications, Inc., San Diego, CA.
Monte Carlo Analysis of Rugosity Effects on gamma-gamma Logs. Final Report.
W. A. Woolson, and V. E. Staggs. 13 Feb 81, 61p GJBX-39(82)
Contract AC13-76GJ01664

The model developed for the Monte Carlo method represents the borehole rugosity surface as a sine wave in cross section in which the amplitude, phase, and wavelength are adjustable parameters. The rugosity surface defines the interface between the formation and the drilling mud or borehole fluid. To compute efficiently the effects of rugosity, the fictitious cross section technique (delta-scattering method). The use of the last-flight, flux-at-a-point estimator with delta-scattering required a new mathematical form, which was developed. The rugosity model also uses correlated sampling. The checkout process for changing MORSE into delta-scattering program is described, and results of two sets of correlated rugosity calculations are discussed.

DE82012226 PC **A06**/MF **A01**
Science Applications, Inc., San Diego, CA.
Borehole Model Calculations for gamma-gamma Logging Tools. Final Report.
W. A. Woolson, and M. L. Gritzner. Aug 80, 105p GJBX-38-82
Contract AC13-76GJ01664

This report discusses modifications and additions to the Monte Carlo procedure to perform gamma-gamma log transport calculations and to produce the evaluation model data base. Section 3 describes the calculational models, provides data on mud and formation compositions, plots the cross sections used in the calculations, and tabulates the various parameters that comprise the calculational data base. Section 4 provides a brief description of the data processing code which operates on the transport data to provide information of interest to the log analyst. Section 5 presents results from the data base appropriate for a particular gamma-gamma tool design. The last two sections are devoted to the analysis of gamma-gamma tools and recommendations for future work, respectively.

DE82012372 PC **A11**/MF **A01**
Oak Ridge National Lab., TN.
Chattanooga Shale: An Assessment of the Resource and Technology for the Recovery of Hydrocarbons and Minerals.
I. Spiewak, E. S. Bomar, and T. R. Butz. Apr 82, 238p ORNL/TM-7920
Contract W-7405-ENG-26
Portions of document are illegible.
Microfiche only after original copies are exhausted.

Chattanooga shale, a large and mineral-rich member of the Devonian oil shales of the Eastern United States, is a resource of about 100 billion bbl of oil, 10 million tons of uranium, and significant quantities of other metals including aluminum, molybdenum, cobalt, columbium, and vanadium. Unlike coal and western oil shale, however, Chattanooga shale is not yet ready for commercial exploitation. The hydrocarbon content, while comparable to that of western shales, is more difficult to extract, and the metals, while generally more varied, are less concentrated than those of resources that are being exploited today. Although this study indicates that a large scale (100,000 tons/day) combined operation for oil and metals recovery appears to be economically attractive, commercial operations are presently impeded by the risks associated with the need for an extremely large capital investment and substantial unknowns with respect to envionmental effects and the methods for mining, processing, and waste disposal. Some of the principal technical problems that require resolution are those of roof stability and water intrusion associated with the underground mining of Chattanooga shale, the need for environmentally acceptable methods for disposal of tremendous quantities of spent shale, and the need for processes that can efficiently recover most of the hydrocarbon and mineral values with minimal loss of expensive processing reagents.

DE82012437 PC **A13**/MF **A01**
Gruy Federal, Inc., Houston, TX.
Field Project to Obtain Pressure Core, Wireline LOG, and Production Test Data for Evaluation of CO sub 2 Flooding Potential. Texas Pacific Bennett Ranch Unit Well No. 310, Wasson (San Andres) Field, Yoakum County, Texas.
T. E. Swift, J. H. Goodrich, R. M. Kumar, R. L. McCoy, and M. H. Wilhelm. Jan 82, 279p DOE/MC/08341-39
Contract AC21-79MC08341
Portions of document are illegible.
Microfiche only after original copies are exhausted.

The coring, logging and testing of Bennett Ranch Unit well No. 310 was a cooperative effort between Texas Pacific, owner of the well, and Gruy Federal, Inc. The requirements of the contract, which are summarized in Enclosure 1, Appendix A, include drilling and coring ac-

tivities. The pressure-coring and associated logging and testing programs in selected wells are intended to provide data on in-situ oil saturation, porosity and permeability distribution, and other data needed for resource characterization of fields and reservoirs in which CO sub 2 injection might have a high probability of success. This report presents detailed information on the first such project. This project demonstrates the usefulness of integrating pressure core, log and production data to realistically evaluate a reservoir for carbon dioxide flood. The engineering of tests and analysis of such experimental data requires original thinking, but the reliability of the results is higher than data derived from conventional tests. (ERA citation 07:042271)

DE82012555 PC **A06**/MF **A01**
Science Applications, Inc., Morgantown, WV.
Analysis of Devonian Shale Multiwell Interference Tests in Meigs County, Ohio. Final Report.
J. Alam, K. Horan, B. Lee, and W. Sawyer. 23 Feb 82, 107p DOE/MC/16283-1155
Contract AC21-81MC16283

The Offset Well Test Program completed in 1981 was undertaken in order to investigate the production characteristics of Devonian shale reservoirs. The investigation involved a study of gas flow through natural fractures, the orientation and distribution of these fractures, and the gas storage/release mechanism and its effect on production. An experiment was designed to test the reservoir under strictly controlled conditions. Interference tests were conducted in Meigs County, Ohio on two wells drilled in the expected maximum and minimum permeability directions from a producing well with known completion and production history. Analysis of the test results indicate that the Devonian shale formation in the Meigs County, Ohio, area is an anisotropic, layered reservoir system. Flow characteristics indicate that the Meigs County reservoir is naturally fractured, may be represented as a dual porosity system, and may be modeled using pseudo-steady-state gas transfer from the matrix to the fracture system. The orientation of the natural fracture system was established through core observation and well test analysis as S65 exp 0 W. The maximum to minimum permeability ratio in the direction of the natural fracture system was calculated to be 8.3. Three distinct zones with independent flow characteristics were identified. The bottom zone, with permeability values significantly higher than the upper two zones, is highly fractured and is a major contributor to the gas production of Well 10056. The pressure profiles of the bottom zones relative to the upper zones were significantly different, indicating minimal communication between the layers. The knowledge of these parameters should have a significant impact on future development of shale reservoirs, through optimization of well spacing and choice of stimulation treatment to enhance gas production. (ERA citation 07:042332)

DE82750001 PC **A03**/MF **A01**
Bundesministerium fuer Forschung und Technologie, Bonn-Bad Godesberg (Germany, F.R.).
Winning of Thick Seams in Discs.
J. Klute. Aug 81, 39p BMFT-FB-T-81-136
In German.Portions of document are illegible.
U.S. Sales Only.

Mining thick faces of irregular structure until now has never been economical. At Emil Mayrisch mine of Bergwerksverein-AG, an integrated longwall system has been developed in cooperation with mining supplier firms. This equipment is a way to mine parts of these unworkable faces in discform. The new equipment had been installed in two workings and modified according to the experiences gained. The knowledge gained in these experimental faces will be applied in further longwall mining under similiar conditions. Technical developments are required in: placing the plow motor on the other side of the conveyor near the main engine; making the main engine better flittable; developing a flittable gate and loader; improving the forepoling bars of the face support system. Disc mining of thick but irregular faces will make winning possible in areas which have been unworkable and uneconomical until now. (ERA citation 07:045622)

DE82902368 PC **A12**/MF **A01**
Bundesministerium fuer Forschung und Technologie, Bonn-Bad Godesberg (Germany, F.R.).
Systems Analysis of Alternative Procedures for Deep Drilling Technique for Depth Between 6000 and 10,000 Meters.
M. Herbricht, H. Ostermann, A. Sowa, K. Arens, and W. Gutsche. 1981, 258p BMFT-FB-T-81-067
In German.
U.S. Sales Only.

Worldwide research activities are/were carried out in the field of rock destruction. Approximately 30 different techniques are investigated. The target of this work was to test these techniques with system analytic methods for the applicability in the deep drilling technique as an alternative drilling method within the depth range of 6000 to 10,000 m. The result shows that only approximately 3 to 5 of the about 30 drilling techniques can be rated as functionally practicable but obviously inferior to the Rotary drilling systems. In conclusion the following items have to be pointed out: (1) The potential of the specific drilling speed in the drilling system cannot be utilized due to the limitation of the secondary systems. (2) The Rotay drilling system is clearly superior to all other new systems in economy, efficiency and reliability. (3) Important improvements can be obtained in the present Rotary drilling system by intensive research and development work in the secondary range, e.g., the automatic signal processing, scavenging techniques, etc. (ERA citation 07:042260)

N82-27516/5 PC **A03**/MF **A01**
Bayerisches Geologisches Landesamt, Munich (Germany, F.R.).
The Boreholes Ortenburg 1 and 2 (1980/81).
Final Report.
H. Gudden, and H. Schmid. Feb 82, 35p BMFT-FB-T-82-004, ISSN-0340-7608
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

Prospecting on the Ortenburg plateau is described. Permian and mesozoic sedimentary rocks of the variscan orogene area are often U, Cu, Pb and Cu bearing, especially layers of reduced thickness and reducing environment as well as the border between crystalline basement and overlying rocks. The outcrops of these rocks are well investigated except where the prospected series are covered by younger formations. The few borings in this region corroborate their interest. Therefore, the boreholds Ortenburg 1 and 2 were sunk, reaching the crystalline basement by a 1 m clastic layer, under tertiary, cretaceous and mesozoic rocks. Chemical analyses show amounts up to 0.15% Pb and 0.1% Cu in the weathered basement and the clastic layer. At the basement top there are peaks in the Gamma Log with intensities of 2x to 3x crystalline background.

PB82-250580 PC **A03**/MF **A01**
Moleculon Research Corp., Cambridge, MA.
Bound Liquid Ion Exchange Membranes for Recovery of Chromium from Wastewater.
Open file rept. (Final) 26 Jun 79-26 Dec 80,
Larry D. Nichols, Arthur S. Obermayer, and Marie B. Allen. 28 Oct 80, 36p BUMINES-OFR-109-82
Contract J0295056

The objective of this program was to investigate the feasibility of bound-liquid ion-exchange membrane systems for removal and recovery of chromate from plating rinse waters, thereby conserving an important resource and minimizing harmful chromate effluent levels. Experimental techniques employed liquid-liquid extraction and simple membrane immersion to assess candidate ion-exchange liquids, followed by chromate transport measurements in membrane test cells using simulated chromate rinse solutions. The transport process is chemically driven by passage of some counter-ion in the opposite direction; counter-ions studied included basic chloride, phosphate, and carbonate solutions. Chloride and carbonate are both effective, and the latter is preferable from a chromate-reuse standpoint. Measured transport rates are in a range suitable for practical use, but membrane lifetimes were limited by a phase-inversion process in which water droplets nucleate within the membrane and eventually halt ion exchange. This phase-inversion process, shown by solutions of quaternary amine in ion exchange reagents in aromatic kerosines whether or not chromate is present, must be prevented to render chromate recovery systems feasible.

PB82-250596 PC **A07**/MF **A01**
Terraspace, Inc., Rockville, MD.
Feasibility and Applicability of Hydraulic Mining and Transport in Underground Noncoal Mines.
Open file rept. 21 Aug 80-20 Aug 81,
William C. Cooley. Sep 81, 126p BUMINES-OFR-108-82
Contract J0205027

This study identifies and evaluates deposits of noncoal minerals in the United States that are most amenable to be mined underground hydraulically and transported hydraulically. A method was developed to screen and compare mineral deposits including economic comparisons. The most applicable minerals for hydraulic mining by borehole monitor jets from underground entries are soft uranium sandstones in locations where water is available. This method with hydrotransport could improve the safety, health, and economy of underground uranium mines. Soft oil-bearing sandstones could be mined and transported by this method more safely than by other underground mining methods.

PB82-251562 PC **A04**/MF **A01**
Little (Arthur D.), Inc., Cambridge, MA.
Development of a Call Alert system for Paging Mine Personnel.
Contract research rept. Jun 76-Jun 77,
John E. Trombly, Stuart Lipoff, and Paul O'Brien. Jun 79, 66p BUMINES-OFR-111-82
Contract H0262026

This report presents system objectives and design criteria for an in-mine ultralow frequency radio paging system. Coding formats, frequency and bandwidth selection criteria leading to the system design are discussed. The prototype call alert transmitter and pocket page receiver is functionally described. The report includes circuit descriptions, schematics, parts lists, printed circuit fabrication, and assembly drawings. The report concludes with an estimate of the manufacturing cost for each assembly.

PB82-253030 PC **A22**/MF **A01**
Alabama Univ., University.
A Directory of Computer Programs Applicable to U.S. Mining Practices and Problems (Period 1970-1981).
Open file rept. 16 Aug 80-15 Feb 82,
Richard L. Sanford, and Michael R. Parrott. Feb 82, 521p BUMINES-OFR-114-82
Contract J0205067

This report summarizes the results of an update on a previous Bureau of Mines grant (G0264026), and includes 5 additional years of computer program development. The directory includes a sampling of computer usage in operating and manufacturing companies, consulting firms, computer companies, research organizations, universities, and various governmental agencies. References to computer applications throughout the industry are presented as well as comments on program availability. The work effort on the updated directory concentrated on programs that are available to the public and are well documented.

PB82-873498 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Agglomeration and Briquetting of Ores and Feeds in Iron and Steel Making. 1966-August, 1982 (Citations from the Metals Abstracts Data Base).
Rept. for 1966-Aug 82.
Aug 82, 144p
Supersedes PB82-853458.

This bibliography contains citations concerning the agglomeration of iron ores, process wastes, and scrap for iron and steel making. The sintering, hot and cold briquetting, and metallization of feeds are included. The direct reduction processes of agglomerated ores in the production of iron and steel are discussed. The physical properties of briquette compositions are traced in furnace conditions. (This updated bibliography contains 224 citations, 29 of which are new entries to the previous edition.)

PB82-873944 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Enhanced Oil Recovery by Hydraulic Fracturing. 1976-August, 1982 (Citations from the Energy Data Base).
Rept. for 1976-Aug 82.
Aug 82, 160p
Prepared in cooperation with the Department of Energy, Washington, DC.

This bibliography contains citations concerning the technology of hydraulic fracturing in oil recovery operations. Fluid mixtures, pressure control mechanisms, hydraulic fracturing theory, mapping of geologic formations for hydraulic fracturing applications, processes, and history and development are among the topics discussed with reference to this technique of Enhanced Oil Recovery (EOR). Performance evaluations of techniques and mechanisms are also presented. (Contains 164 citations fully indexed and including a title list.)

8J. Physical Oceanography

AD-A117 382/2 PC **A05**/MF **A01**
Louisiana State Univ., Baton Rouge. Coastal Studies Inst.
A Collection of Reprints,
S. A. Hsu, David B. Prior, William J. Wiseman, Jr., Robert Gilbert, and H. H. Roberts. Jul 82, 78p Rept nos. TR-344, TR-345
Contract N00014-75-C-0192
Includes Rept. nos. TR-346 through TR-349. Pub. in various Jnls. 1982.

Contents: Some Mesoscale Boundary-Layer Processes Over Coastal Waters; Submarine Slope Processes on a Fan Delta, Howe Sound, British Columbia; Relationship Between Monthly Frontal Overrunning and Offshore-Onshore Temperature Differences Across the Central Gulf Coast; Cold-Water Stress in Florida Bay and Northern Bahamas -- A Product of Winter Cold-Air Outbreaks; Infrared Transmittance of Marine Atmospheres; Physical Processes and Sedimentation on a Broad, Shallow Bank.

AD-A117 384/8 PC **A04**/MF **A01**
Louisiana State Univ., Baton Rouge. Coastal Studies Inst.
A Collection of Reprints,
S. A. Hsu, Ivor van Heerden, John T. Wells, Harry H. Roberts, and David B. Prior. Jul 82, 72p Rept nos. TR-329, TR-331
Contract N00014-75-C-0192
Includes Rept. nos. TR-332, TR-333, TR-335 and TR-336. Pub. in various Jnls. Errata sheet inserted.

Contents: Diurnal Variation of the Low-Level Jet in Somalia; Evolution and Morphology of Sedimentary Environments, Atchafalaya Delta, Louisiana; Geological Surveying of Deepwater Engineering Sites -- Evaluation of Landslide Potential; Accelerated Currents and Sediment Transport off the Damietta Nile Promontory; Response of Bottom Waters on the West Louisiana Shelf to Transient Wind Events and Resulting Sediment Transport; Physical Processes and Sediment Flux Through Reef-Lagoon Systems.

AD-A117 743/5 PC **A07**/MF **A01**
Environmental Research Inst. of Michigan, Ann Arbor.
Radiance Calculations for Optimization of Sensors Designed for Remote Bathymetry. Volume I.
Final technical rept.,
Fred J. Tanis. Jul 82, 137p Rept no. ERIM-155800-1-F1
Contract N00014-81-C-2350

An extensive set of radiance calculations have been generated for each of twelve representative bottom types using an existing water radiance and atmospheric radiative transfer model. Total radiance values were calculated under two separate (Elterman) atmospheric states for a sensor platform altitude of 50 km. Calculations were also made for a sensor placed just below the sea surface. The model parameters were iterated over representative water depths and water types. A preliminary visual band optimization analysis was made over the input parameters. The suitability of Landsat-D Thematic mapper (TM) bands is also addressed. (Author)

8K. Seismology

DE82012493 PC **A03**/MF **A01**
Lawrence Livermore National Lab., CA.
Earthquake Strong-Motion Instrumentation at Lawrence Livermore National Laboratory.
A. F. Shakal, and R. C. Murray. Oct 81, 26p UCRL-53246
Contract W-7405-ENG-48
Portions of document are illegible.

A network of strong-motion accelerographs has been installed at the Lawrence Livermore National Laboratory as part of the LLNL Site Seismic Safety Program. The network has two objectives: (1) to provide quantitative information on the severity of ground shaking for the assessment of structural effects at LLNL following an earthquake, and (2) to provide data for analyses of the free-field ground motion and the causative earthquake. The network includes digital multichannel central-recording systems in Building 111 (9-channel) and in Building 332 (18-channel). Independent analog accelerographs are included to provide redundancy. A multichannel system has also been installed on the spaceframe at the Laser facility. In addition to the structural instrumentation, six free-field stations are located at and near the Laboratory. The strong-motion network will provide rapid indication of peak ground-motion values as well as data for detailed post-earthquake studies of ground motion and structural response. (ERA citation 07:044869)

DE82012814 MF **A01**
Del Mar Technical Associates, CA.
Application of Earthquake Source Modeling to Assess the Relative Differences Between Seismic Ground Motion in the Eastern and Western Regions of the United States and to Characterize the Type and Direction of Incoming Seismic Waves. Final Report.
R. J. Apsel, G. A. Frazier, A. Jurkevics, and J. C. Fried. 30 Sep 80, 200p UCRL-15279
Contract W-7405-ENG-48
Portions of document are illegible.
Available in microfiche only.

This report assesses the relative difference between seismic ground motion in the Eastern (EUS) and Western (WUS) regions of the United States; and provides the necessary input to soil-structure interaction codes concerning type and propagation direction for incoming seismic waves. Implicit is the relevance to the Zion Nuclear Power Plant (ZNPP) site. The relative differences between seismic ground motions in EUS and WUS are assumed to be principally caused by differences in material attenuation. Earthquake rupture and wave propagation through the earth were simulated by performing numerical calculations. Typical results for a Western United States earth structure indicate that essentially no seismic energy emerges at angles shallower than 45 degrees except for low frequency emission from shallow zones of earthquake rupture. The same simulations are repeated for the ZNPP earth structure. The effective incoming waves are seen to be emerging within ten degrees of vertical at Zion for all source/receiver geometries and all frequencies of interest. At high frequency, the reduced material attenuation (corresponding to the higher EUS quality factors) additionally constrains the effective incoming waves to emerge within five degrees of vertical. (ERA citation 07:044868)

8L. Snow, Ice, and Permafrost

AD-A117 839/1 PC **A02**/MF **A01**
Cold Regions Research and Engineering Lab., Hanover, NH.
Snowpack Profile Analysis Using Extracted Thin Sections.
Special rept.,
William L. Harrison. May 82, 19p Rept no. CRREL-SR-82-11

A method is presented for obtaining snow profiles for analysis. The method and required equipment replace former methods such as the 'roaring bonfire' technique and the use of dyes. (Author)

N82-27816/9 PC **A05**/MF **A01**
Technical Univ. of Denmark, Lyngby.
Movement of Ice Markers Measured by Satellite Ranging.
P. Gudmandsen, C. Carle, and J. Maaloee. Jun 81, 82p R-240, ESA-CR(P)-1547
Contract ESA-4634/81

A method for determining the surface velocity of large ice sheets in Greenland and Antarctica involves measuring the change of distance between fixed markers and those on ice sheets, using ERS-1 for altimetry and radar ranging. An acceptable signal to noise ratio can be obtained with the ERS-1 high gain antenna and a marker, consisting of a square trihedral corner reflector, with side length = 1.5 m, radar cross section 55 dB. The high gain antenna limits the area investigated to an 18 km swath, assuming a 5 deg incidence angle. A Swerling type radar cross section of the corner reflector results in a 62% detection probability for 6-pulse integration. Displacement of markers can only be measured at crossing ground tracks when the satellite is operated in a rigid orbit mode, i.e., a 20 X 20 km area. Accuracy of 78 cm is possible.

PB82-811167 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Permafrost Structural Engineering. 1964-July, 1982 (Citations from the NTIS Data Base).
Sep 82, 284p
Supersedes PB81-807281 and PB80-807969.

Construction and structural engineering problems with permafrost are covered in the bibliography of Government-sponsored research reports. Techniques and difficulties encountered with construction on permafrost are included. Creep, compressive properties, frost heave, and deformation, as related to permafrost soils and conditions, are discussed for cold weather and changing weather construction. (This updated bibliography contains 277 citations, 4 of which are new entries to the previous edition.)

PB82-811175 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Permafrost Engineering. September, 1977-August, 1982 (Citations from the Engineering Index Data Base).
Sep 82, 186p
Supersedes PB81-807299 and PB80-807977.

The bibliography covers worldwide engineering research on permafrost. Foundations, structural engineering, and soil mechanics are covered. Heat transfer, ground water, drainage, melting, freezing, and thawing conditions are included. The effects on permafrost by mining, oil and gas well drilling, well logging, pipelines, and hydrologic engineering and general building are cited. (This updated bibliography contains 177 citations, 36 of which are new entries to the previous edition.)

8M. Soil Mechanics

AD-A117 835/9 PC **A06**/MF **A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS. Geotechnical Lab.
Analysis of Field Compaction Data, DeGray Dam, Caddo River, Arkansas.
Final rept.,
William E. Strohm, Jr., and Victor H. Torrey, III . Mar 82, 107p Rept no. WES/MP/GL-82-4

This report presents a review of the materials, specifications, procedures, equipment, and testing pertinent to construction and compaction control of the earth-fill embankment of DeGray Dam, Caddo River, Arkansas, constructed by the U. S. Army Engineer District, Vicksburg. This report includes summation and analyses of the compaction control data submitted by the district to the U. S. Army Engineer Waterways Experiment Station. (Author)

AD-A117 889/6 MF **A01**
Cold Regions Research and Engineering Lab., Hanover, NH.
Evaluation of Methods for Calculating Soil Thermal Conductivity,
Omar T. Farouki. Mar 82, 100p Rept no. CRREL-82-8
Availability: Microfiche copies only.

A detailed analysis of methods for calculating the thermal conductivity of soils is presented, and trends in the predictions of these methods are compared. The influ-

ence of changes in the moisture content on the calculated thermal conductivity of a soil (at constant dry density) is shown as is the sensitivity of this calculated value to changes in dry density or in the soil solids' thermal conductivity. The methods are evaluated to determine the extent of agreement of their predictions with measured values obtained on soils of known composition and properties. The deviations of the predicted values are determined for soils that are unfrozen or frozen, coarse or fine, unsaturated, saturated or dry. The applicability of each of the methods under various conditions is determined and recommendations are made as to the best method for each condition. (Author)

PB82-252735 PC **A04**/MF **A01**
Indian Agricultural Research Inst., New Delhi.
Indian Agriculture Research Institute. Division of Soil Science and Agricultural Chemistry: Activities and Achievements.
1982, 57p

One of the most important contributions of IARI scientists during the last 75 years has been in generating the basic information which the country today has on its soil, and its structure and fertility. This report contains the major research activities and achievements of the Division. The main objectives of this Division is to carry out research work on the fundamental and applied aspects of the physical, chemical, minerological, and biological properties of soils, fertilizers, and manures, and their interaction with soil and plant for improvement and maintenance of soil fertility.

9. ELECTRONICS AND ELECTRICAL ENGINEERING

9A. Components

AD-A117 525/6 PC **A03**/MF **A01**
Utah Univ., Salt Lake City. Dept. of Bioengineering.
Equilibrium Noise in Ion Selective Field Effect Transistors.
Interim technical rept.,
Andre M. Haemmerli, Jiri Janata, and James J. Brophy. 21 Jul 82, 36p Rept no. TR-1
Contract N00014-81-K-0664

It has been shown that noise which is in excess of the semiconductor device noise can be identified with the electrochemical processes taking place in ISFETs. The frequency analysis of this noise yields information about interfacial capacitance and exchange current density at the membrane/solution interface. These parameters have been evaluated for several ion-selective membranes.

AD-A117 532/2 PC **A02**/MF **A01**
Thomas Electronics, Inc., Wayne, NJ.
Manufacturing Methods and Technology (MM&T) Specifications for Miniature Cathode Ray Tube.
Quarterly rept. no. 6, 1 Jan-31 Mar 82,
F. M. Bruno. 30 Apr 82, 16p Rept no. TEI-A009-6
Contract DAAK70-80-C-0168

TEI continued to evaluate materials and components intended for use in fabrication of CRT assemblies for the 3rd Submission of Phase I - Engineering Samples: (1) Life-testing of the P43 phosphor with the fiber optic faceplate and the clear faceplate, and (2) The 1.3" radius fiber optic faceplate and the latest yoke design. A vendor-caused delay was experienced in the planned evaluation of seamless, versus regular-production lap-seam, Mu-metal shields. TEI's newly-constructed in-house equipment became operational to duplicate the EM's conditions for the sine-wave modulation response test. TEI made recommendations to modify testing requirements specified in the contract and the MM&T project, in order to reduce an appreciable delay in the scheduled completion date. (Author)

AD-A117 673/4 PC **A02**/MF **A01**
Construction Engineering Research Lab. (Army), Champaign, IL.
Arc-Sprayed Metals for Structural Electromagnetic Shielding.
Final rept.,
Paul Nielsen. Jun 82, 22p Rept no. CERL-TR-M-316

Electromagnetic shielding tests of small samples (2 ft by 4 ft or 0.61 m by 1.22 m) of arc-sprayed metals on typical construction materials were conducted to determine the feasibility of using arc-spray technology to provide a low-cost method of shielded construction. Test results indicate that such panels can provide significant shielding and that this technology may be useful for applications having a low shielding requirement. In an additional study, it was determined that arc-spraying of leaky seams of conventional modular shielded construction can provide increased electromagnetic shielding. (Author)

DE82012233 PC **A06**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Radiation Effects in Pigtailed GaAs and GaA1As LEDs.
C. E. Barnes. Jun 81, 113p AFWAL-TR-81-1086
Contract AC04-76DP00789
Portions of document are illegible.

Permanent and transient radiation effects have been studied in Plessey pigtailed, high radiance GaAs and GaAlAs LEDs using neutron, gamma ray and X-ray sources. The radiation-induced source of degradation in these devices was determined by also examining both bare, unpigtailed LEDs and separate samples of the Corning fibers used as pigtails. No transient effects were observed in the unpigtailed LEDs during either pulsed neutron or X-ray exposure. In contrast, the Corning doped silica fibers exhibited strong transient attenuation following pulsed X-ray bombardment. Permanent neutron damage in these pigtailed LEDs consisted essentially of light output degradation in the LED itself. Permanent gamma ray effects due to a Co-60 irradiation of 1 megarad were restricted to a small increase in attenuation in the fiber. The two primary radiation effects were then transient attenuation in the fiber pigtail and permanent neutron-induced degradation of the LED. (ERA citation 07:047445)

PAT-APPL-6-358 940 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Fabrication of Schottky Barrier Diodes on PbCl2 PbS.5Se.5 Epitaxial Films.
Patent Application,
Tak-Kim Chu, and Alan C. Bowley. Filed 17 Mar 82, 12p AD-D009 581/0
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This abstract discloses a process for preparing an infrared sensitive photodiode comprising the steps of: forming by vacuum deposition an epitaxial layer of a semiconductor alloy material to cover at least a portion of the surface of a substrate composed of an infrared transparent single crystal material which is an alkali halide or an alkaline earth halide; forming a layer of a lead halide which is PbC12, PbBr2, PbF2, or mixtures thereof on the epitaxial layer of semiconductor material by exposing the epitaxial layer to vapor of the lead halide in air for at least 6 hours wherein the lead halide vapor is produced by heating the lead halide at a temperature of from about 175 degrees C to about 225 degrees C; vacuum depositing Pb metal onto a portion of the epitaxial layer of semiconductor alloy material to form a non-Ohmic Pb metal contact; and forming an Ohmic contact on another portion of the epitaxial layer of semiconductor material.

PATENT-4 300 115 Not available NTIS
Department of the Army, Washington, DC.
Multilayer Via Resistors.
Patent,
Joseph L. Ansell, and Raymond J. Baker. Filed 2 Jun 80, patented 10 Nov 81, 4p AD-D009 545/5, PAT-APPL-6-155 713
Supersedes PAT-APPL-6-155 713, AD-D007 899.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A substrate has two or more conductive layers deposited thereon, each adjacent layer pair separated by a dielectric layer. Aperture are formed in the dielectric layer and are filled with resistor paste. In this way, a resistive path may be formed between the conductive layers. This concept of fabricating resistors are particularly useful in the inclusion of pull-up, pull-down and other non-critical resistors in the circuitry contained within a thick film construction. (Author)

PATENT-4 304 462 Not available NTIS
Department of the Army, Washington, DC.
Thermal Hardened Fiber Optic Cables.
Patent,
Anthony J. Baba, and Stewart Share. Filed 16 Apr 80, patented 8 Dec 81, 5p AD-D009 543/0, PAT-APPL-6-140 903
Supersedes PAT-APPL-6-140 903.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Fiber optic cables suitable for use in nuclear radiation environments are disclosed which comprise a protective shield of low absorptance material which reflects thermal radiation. The shield is composed of layers of aluminum and Teflon. (Author)

PATENT-4 316 201 Not available NTIS
Department of the Navy, Washington, DC.
Low-Barrier-Height Epitaxial Ge-GaAS Mixer Diode.
Patent,
Aristos Christou, and John E. Davey. Filed 8 May 80, patented 16 Feb 82, 4p AD-D009 530/7, PAT-APPL-6-147 992
Supersedes PAT-APPL-6-147 992, AD-D007 313.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A high-frequency (9.3 GH2-94 GH2) gallium arsenide (GaAs) mixer diode having a low Schottky barrier height (approximately 0.4 eV) for operating at low noise figure levels at low local oscillator power levels (0.25 mW -0.75 mW), includes a GaAs substrate, a thin (about 100 A) epitaxial layer of germanium on the substrate, the epitaxial germanium being deposited at a rate of about 6 A per minute and at a substrate temperature in the range of 325 degrees C.-425 degrees C, a layer of silicon dioxide (Si02), the Si02 being etched, and layers of platinum-titanium-molybdenum-gold on the growth of epitaxial germanium. Contact areas are then plated with a layer of gold. Ohmic contact to the GaAs substrate side includes a deposition of gold-germanium alloy. Each of the layers are individually deposited at certain temperatures and thicknesses in a vacuum. (Author)

PB82-872995 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Cathode Ray Tubes. 1974-August, 1982 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1974-Aug 82.
Aug 82, 212p
Supersedes PB81-855421.Prepared in cooperation with the National Aeronautics and Space Administration, Washington, DC.

This bibliography contains citations concerning new capabilities of CRT'S, such as color or monochromatic displays, editing, graphics, on board floppy disks, digital cassettes, and built-in microprocessors. Applications of CRT'S in aircraft, computer, and video are also presented. (This updated bibliography contains 223 citations, 121 of which are new entries to the previous edition.)

PB82-873266 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Cathode Ray Tubes. June, 1970-August, 1982 (Citations from the NTIS Data Base).
Rept. for Jun 70-Aug 82.
Aug 82, 239p
Supersedes PB80-851439.

This bibliography contains citations concerning new capabilities of cathode ray tubes, such as color or monochromatic displays, editing, graphics, on board floppy disks, digital cassettes, and built-in microprocessors. Applications of CRT'S in aircraft, computers, and video are also presented. (This updated bibliography contains 217 citations, 77 of which are new entries to the previous edition.)

PB82-873985 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Encapsulation of Semiconductor Devices. 1975-August, 1982 (Citations from the International Information Service for the Physics and Engineering Communities Data Base).
Rept. for 1975-Aug 82.
Aug 82, 219p

This bibliography contains citations concerning technology and analysis of semiconductor device encapsulation. Encapsulants and techniques of encapsulating, coating, and deposition are discussed. Failure analysis, environmental testing, and thermal stress analysis are considered. (Contains 202 citations fully indexed and including a title list.)

9B. Computers

AD-A117 364/0 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
MSTRIP2: Parameters of Microstrip Transmission Lines and of Coupled Pairs of Lines--1978 Version and Its Application.
Technical rept.,
Jerald A. Weiss, Richard S. Withers, and Rodney C. Lewis. 4 Jun 82, 23p TR-600, ESD-TR-82-035
Contract F19628-80-C-0002

MSTRIP has undergone a succession of improvements since its original publication in 1968. Performance of the 1974 and later versions relating to aspects including weakly coupled (< -30 dB) pairs, low shield heights (closer than substrate thickness), and extremely low-impedance lines will be discussed. A FORTRAN list of the 1978 version is appended. (Author)

AD-A117 373/1 PC **A05**/MF **A01**
Naval Ocean Systems Center, San Diego, CA.
LMDS Lightweight Modular Display System.
Technical rept. Oct 77-Jan 82,
A. D. Gomez, S. W. Wolfe, E. W. Davenport, and B. D. Calder. 16 Feb 82, 93p Rept no. NOSC/TR-767

The Lightweight Modular Display System (LMDS) consists of a set of low-cost modules integrated into a low-power, lightweight, general-purpose display system. LMDS was developed for broad application aboard surface combatant command and control systems and noncombatant platforms in the 1990 time frame. The LMDS introduces innovative approaches to human interface, thermal and shock management, power distribution, architecture, sensor display, and system management. This design approach enables the LMDS to significantly improve upon operator efficiency, cost, size, weight, and maintenance factors as compared to traditional display systems. (Author)

AD-A117 450/7 PC **A07**/MF **A01**
Rensselaer Polytechnic Inst., Troy, NY. Image Processing Lab.
Octree Generation, Analysis and Manipulation.
Technical rept.,
Donald Meagher. Apr 82, 149p Rept no. IPL-TR-027
Contract N00014-82-K-0301

Octree Encoding is a solid modeling method designed for the high-speed manipulation, analysis and display of arbitrary 3-D objects. The technique is based on a hierarchical 8-ary tree or octree for object representation. Octree Encoding is presented and analyzed along with a discussion of the major considerations involved in its development. Techniques for the efficient conversion into octrees of convex polyhedra and restricted analytic objects are presented. Strategies for unrestricted and concave object conversion are also discussed. Algorithms for the measurement of object properties (volume, surface area, center of mass, moment of inertia, segmentation of disjoint parts, number of interior voids and a correlation between two objects), geometric operations (translations, scaling, rotation, concatenated geometric operations, nonlinear operations and perspective transformation) and rotational swept volume are developed. (Author)

AD-A117 461/4 PC **A03**/MF **A01**
Arizona Univ., Tucson. Engineering Experiment Station.
A Summary Discussion of CONLAN.
Final rept.,
Frederick J. Hill. 15 Jul 82, 49p
Contract N00014-79-C-0368

CONLAN is a proposed family of standard hardware description languages developed by a six person international working group. It stresses strong typing and formal semantic development so that the results of simulation at different language levels can be formally checked. This project funded a small portion of the CONLAN development including the writing of the CONLAN introduction contained herein. This introduction will be adapted to form the first chapter of the overall CONLAN report to be published by Springer-Verlaag. (Author)

AD-A117 529/8 PC **A03**/MF **A01**
Desmatics, Inc., State College, PA.
Factor Screening in Simulation: Evaluation of a Random Balance/Plackett-Burman Strategy.
Technical rept.,
Carl A. Mauro, and Dennis E. Smith. Jul 82, 28p
Rept no. TR-113-6
Contract N00014-79-C-0650

Large, complex simulation models usually must be studied by performing a number of simulation runs. It is often to our advantage to invest a relatively small number of runs in a preliminary experiment aimed at screening out the most important factors. The major experimental effort and expense can then be focused on these key factors. In this report we evaluate the performance of a two-stage screening strategy that is based on a combination of random balance and Plackett-Burman designs.

AD-A117 544/7 PC **A12**/MF **A01**
Dayton Univ., OH. Research Inst.
A Preprocessor System for Finite Element Analysis.
Final rept. Mar 80-Sep 81,
Robert A. Brockman, Ted S. Bruner, and Kent A. Primrose. Feb 82, 252p UDR-TR-81-147, AFWAL-TR-81-3180
Contract F33615-80-C-3403
See also Rept. nos. AFWAL-TR-80-3151, AD-A099 530 and AFWAL-TR-81-3181, AD-A116 541.

A preprocessor system developed for use in connection with three-dimensional finite element analysis is described. The system consists of several data entry modules, a central preprocessor and various data translation and conversion utilities. Data entry and generation functions include keyboard, digitizer and file inputs, which are oriented toward the type of thick shell geometry currently encountered in aircraft transparency analysis. The main preprocessor operates on models in 'superelement' form, permitting selective mesh refinement, numerous geometric transformations, and merging of separate models to form the final analysis mesh. Data reformatting modules permit the generation of a complete input file for finite element analysis, and/or the translation of finite element data into other forms for archiving or further processing external to the preprocessor itself. (Author)

AD-A117 585/0 PC **A04**/MF **A01**
New Jersey Inst. of Tech., Newark.
Predictive Model for Jet Engine Test Cell Opacity.
Final rept. 1 Jul 80-30 Sep 81,
Gordon A. Lewandowski. 30 Sep 81, 74p AFESC/ESL-TR-81-46
Contract F08635-80-C-0222

A computer program (written in FORTRAN for a CDC 6600) was developed to predict the plume opacity of jet engine test cells. The data input required for the model includes: the particle density, concentration, and size distribution in the exhaust gas, and the effective stack diameter. Previous data obtained for j-57 engines were used to test the model, and the difference between the theoretical and measured transmittance was generally within one percent. The program also predicts the theoretical effect of using electrostatic precipitators or venturi scrubbers to treat the exhaust emissions. These predictions indicate that control devices larger than the test cells would have to be installed to even achieve a minimal effect on the observed visibility. (Author)

AD-A117 647/8 PC **A03**/MF **A01**
MITRE Corp., Bedford, MA.
Analysis of Interactive Graphics Display Equipment for an Automated Photo Interpretation System.
Technical rept.,
E. J. McLaughlin. Jun 82, 41p MTR-8224, ESD-TR-82-134
Contract F19628-82-C-0001

Off-the-shelf interactive graphics display systems were analyzed relative to the Foreign Technology Division's (FTD's) photo analysis process. Standalone and cluster display systems were evaluated for their effectiveness in constructing engineering drawings and generating reports. The Evans and Sutherland Multi-Picture System is a representative candidate for FTD use based upon performance and cost considerations. (Author)

AD-A117 653/6 PC **A05**/MF **A01**
Carnegie-Mellon Univ., Pittsburgh, PA. Dept. of Computer Science.
Workload, Performance, and Reliability of Digital Computing Systems.
Final rept.,
Xavier Castillo. 1 Dec 80, 97p Rept no. CMU-CS-81-104
Contract DASG60-80-C-0057

In this paper a new modeling methodology to characterize failure processes in Time-Sharing systems due to hardware transients and software errors is summarized. The basic assumption made is that the instantaneous failure rate of a system resource can be approximated by a deterministic function of time plus a zero-mean stationary Gaussian process, both depending on the usage of the resource considered. The probability density function of the time to failure obtained under this assumption has a decreasing hazard function, partially explaining why other decreasing hazard function densities such as the Weibull fit experimental data so well. Furthermore, by considering the Kernel of the Operating System as a system resource, this methodology sets the basis for independent methods of evaluating the contribution of software to system unreliability, and gives some non obvious hints about how system reliability could be improved. A real system has been characterized according to this methodology, and an extremely good fit between predicted and observed behavior has been found. Also, the predicted system behavior according to this methology is compared with the predictions of other models such as the exponential, Weibull, and periodic failure rate. (Author)

AD-A117 660/1 PC **A03**/MF **A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg. Computer Science, Industrial Engineering and Operations Research.
The DMS Multiprocess Execution Environment.
Technical rept.,
Roger W. Ehrich. Apr 82, 43p Rept no. CSIE-82-6
Contract N00014-81-K-0143

In this report a language-independent multiprocessing environment for managing human-computer dialogue is described. One of the main reasons for such an environment is that it helps to enforce the separation of modules that deal with human-computer dialogue from those that deal with computation while at the same time providing for concurrencies that would not otherwise be possible. Embedded in the environment are debugging aids that facilitate software preparation and a priority mechanism for sequencing interprocess communications. (Author)

AD-A117 722/9 PC **A07**/MF **A01**
Arizona Univ., Tucson. Digital Image Analysis Lab.
Optical Computations for Image Bandwidth Compression.
Final rept. 15 Mar 81-14 Mar 82,
B. R. Hunt, and R. Schowengerdt. 15 May 82, 138p DIAL/EE-81-005, AFOSR-TR-82-0580
Grant AFOSR-81-0170

This report summarizes the previous year's research in optical processing and optical/digital processing methods for image data compression. The following

topics are discussed: (1) Radiometric and spatial transformations to achieve adaptive image data compression; (2) Spatial optical subsampling and spectral/spatial reconstruction for image data compression; and (3) Temporal interframe data compression. (Author)

AD-A117 755/9 PC **A05**/MF **A01**
University of Southern California, Los Angeles. Center for Laser Studies.
Studies of Bistable Optical Devices.
Final rept. Sep 78-Jan 82,
Elsa Garmire. 15 May 82, 83p AFOSR-TR-82-0572
Grant AFOSR-78-3686

This report outlines the results of a three-and-a-half year research program in Optical Bistability and its applications for Optical Signal and Image processing. The results of the program are in four areas: (1) Study of image processing in the ultra-thin nonlinear Fabry-Perot, and demonstation (theoretically) that parallel processing of more than 1,000,000 bits in 10 to the -9th power seconds is feasible with current technology. This is an overall bit rate of 10 to the 15th power per second, using bistability in Insb; (2) Study of hybrid electro-optic bistable devices for array processing, and development of a concept to simultaneously process over 2500 parallel bits in a nanosecond, in a linear array; (3) Studies of bistability in new materials and new geometries. This includes saturable absorbers, InAs, distributed feedback and four-wave mixing; and (4) Studies of dynamic effects in optical bistability, including critical slowing down, pulse shaping, overshoot switching, alternate switching risetime detection, pulse detection, and self-oscillation. (Author)

AD-A117 762/5 Not available NTIS
Georgia Inst. of Tech., Atlanta. School of Electrical Engineering.
Incoherent Spatial Filtering,
William T. Rhodes. 12 Nov 79, 9p ARO-14572.10-EL
Grant DAAG29-76-G-0340
Availability: Pub. in Optical Engineering, v19 n3 p323-330 May/Jun 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A117 821/9 PC **A02**/MF **A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Industrial Engineering and Operations Research.
Digital Image Quality and Interpretability: Database and Hardcopy Studies,
H. L. Snyder, M. E. Maddox, D. I. Shedivy, J. A. Turpin, and J. J. Burke. 4 Aug 81, 12p AFOSR-TR-82-0614
Contract F49620-80-C-0057
Pub. in Optical Engineering, v21 n1 p14-22 Jan/Feb 82, Invited Paper IQ-102. Prepared in cooperation with Arizona Univ., Tucson, Optical Sciences Center.

No abstract available.

AD-A117 915/9 PC **A03**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Distributed Vs. Centralized Database Systems - Transaction Execution Cost and Performance Analysis.
Technical rept.,
Dushan Z. Badal. Jul 82, 27p Rept no. NPS52-82-007

The purpose of this paper is twofold. First, we investigate the impact of concurrency control on transaction execution cost and system throughout in centralized and distributed data base systems (DBS) based on slow and fast (local) networks. Second, we show that in terms of transaction execution cost and DBS throughput, there are some applications for which any distributed DBS can be more effective than any centralized DBS and vice versa. We also argue that for other applications the decision in favour of distributed or centralized DBS should be based on the comparison of specific DBS systems. (Author)

AD-A117 948/0 PC **A06**/MF **A01**
Systems Control Technology, Inc., Palo Alto, CA.
Enhancements and Algorithms for Avionic Information Processing System Design Methodology.
Final rept.,
K. Doty, A. Lemoine, and P. McEntire. 16 Jun 82, 125p NADC-81105-50
Contract N62269-81-C-0477

This report continues the study of both the software allocation and hardware configuration aspects of avionic information processing systems. The previously developed spatial dynamic programming algorithm is enhanced by incorporating task precedence constraints and hardware failures. Stochastic network methods are used to analyze allocations in the presence of random fluctuations. Graph theoretic methods are used to analyze hardware designs, and new designs are constructed with better values of important parameters, such as the graph diameter. (Author)

DE82007985 PC **A03**/MF **A01**
Lawrence Livermore National Lab., CA.
Software Tools and More for Modcomp Computers.
E. D. Luebke. Dec 81, 42p UCID-19287
Contract W-7405-ENG-48
Portions of this report are illegible.

Programming on Modcomp computers can be made easier with several software tools, or utilities. This paper presents some utilities used by the Modcomp users of LLNL. For the greatest utility, these tools have been written so as to run on all series of Modcomp computers. (ERA citation 07:048952)

DE82007990 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Stop: A Fast Procedure for the Exact Computation of the Performance of Complex Probabilistic Systems.
G. C. Corynen. Jan 82, 13p UCRL-53230
Contract W-7405-ENG-48
Portions of this report are illegible.

A new set-theoretic method for the exact and efficient computation of the probabilistic performance of complex systems has been developed. The core of the method is a fast algorithm for disjointing a collection of product sets which is intended for systems with more than 1000 components and 100,000 cut sets. The method is based on a divide-and-conquer approach, in which a multidimensional problem is progressively decomposed into lower-dimensional subproblems along its dimensions. The method also uses a particular pointer system that eliminates the need to store the subproblems by only requiring the storage of pointers to those problems. Examples of the algorithm and the divide-and-conquer strategy are provided, and comparisons with other significant methods are made. Statistical complexity studies show that the expected time and space complexity of other methods is O(me/sup n/), but that our method is O(nm exp 3 log(m)). Problems which would require days of Cray-1 computer time with present methods can now be solved in seconds. Large-scale systems that can only be approximated with other techniques can now also be evaluated exactly. (ERA citation 07:048958)

DE82009304 PC **A05**/MF **A01**
Lawrence Livermore National Lab., CA.
MAZE: An Input Generator for DYNA2D and NIKE2D.
J. O. Hallquist. Mar 82, 99p UCID-19029(Rev.1)
Contract W-7405-ENG-48
Portions of document are illegible.
Microfiche only after original copies are exhausted.

MAZE is an interactive program that has been developed as an input generator for DYNA2D and NIKE2D; however, the generated mesh file is compatible with other finite element programs as well. The purpose of this report is to provide a user's manual. Since the development is ongoing, users are invited and encouraged to make suggestions concerning any options or features that they would like added. (ERA citation 07:048951)

DE82009632 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
ORNL Computerized Text-Management System: Structure and Coding Schemes.
C. Whitmire, Jr., and J. D. Mason. 1982, 7p CONF-820147-1
Contract W-7405-ENG-26
Meeting of DOE publications managers, Washington, DC, USA, 1 Jan 1982.

Our basic system has the essential elements of most typesetting systems: a minicomputer, video-display terminals (VDTs), a phototypesetter, and programs to tie all these together. In our case, the computer is a PDP-11/70 from Digital Equipment Corporation. The VDTs are supplied by the source of our primary programs, Interactive Systems Corporation. The phototypesetter is an APS- mu 5 from Autologic. The typesetting programs are included in INcompose, a part of the Interactive System/One (IS/1) operating system. IS/1 is itself a commercial version of the UNIX operating system developed at Bell Laboratories. (ERA citation 07:048896)

DE82011989 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Software for Device-Independent Graphical Input.
G. Hamlin. 1982, 6p LA-UR-82-696, CONF-820530-1
Contract W-7405-ENG-36
Graphics interface 82 conference, Toronto, Ontario, Canada, 17 May 1982, Portions of document are illegible.

A three-level model and a graphics software structure based on the model that was developed with the goal of making graphical applications independent of the input devices are described. The software structure makes graphical applications independent of the input devices in a manner similar to the way the SIGGRAPH CORE proposal makes them independent of the output devices. A second goal was to provide a convenient means for application programmers to specify the user-input language for their applications. The software consists of an input handler and a table-driven parser. The input handler manages a CORE-like event queue, changing input events into terminal symbols and making their terminal symbols available to the parser in a uniform manner. It also removes most device dependencies. The parser is table driven from a Backus-Naur form (BNF) grammer that specifies the user-input language. The lower level grammar rules remove the remaining device dependencies from the input, and the higher level grammar rules specify legal sentences in the user-input language. Implementation of this software is on a table-top minicomputer. Experience with retrofitting existing applications indicates that one can find a grammar that removes essentially all the device dependencies from the application proper.

DE82013342 MF **A01**
Union Carbide Corp., Oak Ridge, TN. Computer Sciences Div.
Data Base Simulator.
D. J. Pack. Mar 82, 56p ORNL/CSD/TM-171
Contract W-7405-ENG-26
Portions of document are illegible.
Available in microfiche only.

This document describes the features of and input to a computer program written for the purpose of generating data bases whose data values contain deterministically known errors. The development of the computer program was motivated by the need to assess automatic data editing procedures for data validation of real data bases. The observed values in the simulated data are the sum of generated true values and generated error values. For a given variable, true data values may be generated by any of the following six methods: frequency distribution, conditional frequency distribution, analysis of variance model, multiple regression model, ARIMA time series model, membership within a defined constrained region. The error values for a given variable may be simulated from an independent distribution or from a distribution dependent upon the error values of other specified variables. The computer program described can be used to satisfy other needs in the area of data simulation beyond the specific need expressed above. Since the addition of errors to the true values is optional, one may readily simulate observed data for variables using one or more of the six previously listed methods. (ERA citation 07:045450)

DE82013386 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Simulating the Operation of a Port Contender with SIM 4: Applying Monte Carlo Techniques to the Gandalf PACX IV.
L. F. Totendino. Mar 82, 16p SAND-82-0162
Contract AC04-76DP00789

A simulation program, SIM 4, has been written which utilizes usage statistics to project PACK IV performance. Using this program, system managers can allocate scarce resources in an efficient manner. (ERA citation 07:045456)

DE82701205 MF **A01**
UKAEA Atomic Energy Research Establishment, Harwell (England). Nuclear Physics Div.

Improving Existing Computer Codes by Interactive Computer Graphics: HAREA, An Interactive Program to Derive Resonance Parameters by Area Analysis of Neutron Transmission Data.
D. B. Syme, J. P. Argyle, and A. D. Gadd. Aug 81, 53p AERE-R-10140
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

An arrangement of programs is described providing interactive computer graphics assistance to improve the operation of an existing fitting program. The particular example is the well-known Atta-Harvey code used in resonance area analysis of neutron transmission data. This report is intended both as a manual for running the area analysis programs and as a practical example of program improvement by interactive programming methods. (Atomindex citation 13:658147)

DE82902440 MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Projekt Prozesslenkung mit DV-Anlagen.
Systematic Support of the Software Development for Process- and Microcomputers.
P. J. Deyda, H. Hackstein, and G. Koeberly. Sep 81, 93p KFK-PDV-208
In German.Portions of document are illegible.
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

This report summarizes the results of the project Concepts for the Efficient Development of Software for Mini- and Microcomputers. The software life cycle, development methods and tools were examined, SADT was tested and computer support for SADT text and graphics was developed. A concept using distributed mini- and microcomputers for microcomputer software development support was proposed. A decision table processor, structured assembler macros for the 8080/8085 etc. were developed and are described here. (ERA citation 07:045432)

DE82902577 PC **A05**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Datenverarbeitung in der Technik 2.
Database Query Language FAQUEL.
F. J. Polster, and P. Tritschler. Mar 81, 99p KFK-3089
In German.
U.S. Sales Only.

FAQUEL is the interactive, selfcontained query language of the database system FADABS; the FADABS query system is a component of process information systems. It is to provide the user group of nonprogrammers - physicists, chemists, technicians - with convenient features for the retrieval of data from and manipulation of FADABS databases in an interactive fashion, i.e. without prior programming. The main goal was the development of a query language which is easy to learn and understand and applicable in typical real world situations. The design was influenced by languages like TAMALAN and SEQUEL2. (ERA citation 07:045430)

N82-27707/0 PC **A04**/MF **A01**
National Physical Research Lab., Pretoria (South Africa). Optical Sciences Div.
Conversion of SRSC Format Landsat Tapes into VICAR Compatible Format VCF Tapes.
B. Turner. Jun 81, 66p CSIR-FIS-256, ISBN-0-7988-2142-6

Two computer programs used to convert computer compatible LANDSAT data tapes into a format compatible with the VICAR m image processing system installed at the CCS IBM 370/158 computer are described. This system requires 2400 foot, 9 track magnetic tape with 1600 bits per inch density.

N82-27992/8 PC **A02**/MF **A01**
Ben-Gurion Univ. of the Negev, Beersheba (Israel).
Processing of Encrypted Commercial Data.
B. Arazi. Sep 81, 14p CSIR-TWISK-225

A simple encryption scheme is suggested for processing encrypted commercial data stored in the memory of a central computer offering a time sharing service. The validity of the scheme is deduced from certain basic characteristics of commercial data processing. Maintenance of the security of commercial information is made possible.

N82-28038/9 PC **A04**/MF **A01**
Salford Univ. (England).
Simulation Studies with Modern Computer Structures.
Final Report.
R. E. Crosbie, J. L. Hay, S. Javey, M. D. Narotam, and J. B. Slater. Oct 81, 68p ESA-CR(P)-1546
Contracts ESA-4155/79/NL-PP(SC), RE-L1-83

The potential of recent advances in computer structures for improving the cost effectiveness of simulation activities was investigated. The feasibility of implementing simulation software on these advanced systems, while maintaining user friendliness and computational economy both, was studied. Only systems that have an at least partly proven design were considered. Results emphasize the necessary modifications to conventional approaches to computerized simulation which are required in order to ensure that effective use is made of the chosen computer architecture. The numerical techniques and algorithms as well as the more general software environment of continuous-systems simulation are described.

N82-28040/5 PC **A04**/MF **A01**
Royal Inst. of Tech., Stockholm (Sweden). Dept. of Numerical Analysis and Computing Science.
MULTI, ARITFU and ANALFU: Procedures Written in ALGOL-Simula for Multiple Precision Arithmetic and Some Number Theoretic Computations.
H. Riesel. 1982, 54p TRITA-NA-8202

Programs and ALGOL procedures for the DEC-10 and DEC-20 computers are described. The package is to support research in certain areas of number theory, such as index computations, primality tests, factorization and some analytic work. Three SIMULA external classes are listed: multiple precision integer arithmetic (MULTI), arithmetical functions (ARITFU), and analytic functions (ANALFU). The class MULTI contains, apart from procedures for the four basic arithmetic operations, procedures for input/output operations, operations for rational arithmetic, the square root, and so on for large integers. The class ARITFU contains the most common arithmetical functions, mainly those which depend on the factorization of the argument n. They all have an integer as argument and the result is also one or more integers. The procedures in the class ANALFU were conceived in order to solve a specific problem: the evaluation of certain sums and products taken over all primes. Programming examples and the program code for each of the three classes are given.

N82-28045/4 PC **A02**/MF **A01**
Societe Nationale Industrielle Aerospatiale, Les Mureaux (France).
Data Processing and System Safety.
J. L. Deschanels, P. Lavendrine, J. P. Menard, and P. Pekar. 1981, 15p SNIAS-821-422-108
Presented at 5TH System Safety Conf., Denver, 26-31 Jul. 1981.

The vulnerability of different data processing structures to accident or sabatoge as well as computer information security are considered. Characteristics of data processing architectures (centralization; decentralization; site location) and security implications are discussed. The multiplicity of structures possible in automated systems emphasizes the need for security which should be defined by precise objectives and, if possible, quantified. A system safety program that allows for risk analysis is presented. The program, PARI, is composed of 12 modules. Data processing risk is determined by an overall fault tree method. The importance of a systematic approach is stressed.

N82-28219/5 PC **A04**/MF **A01**
National Aerospace Lab., Amsterdam (Netherlands).
Functional Requirements for a Software Cost Data Base.
G. J. Dekker, M. Vanderwilt, and F. J. Vanderbosch. 4 Feb 81, 61p NLR-TR-81017-U
Contract NIVR-1870

Software cost estimation techniques and available cost data bases were surveyed through the literature. Cost estimation of software development and control of cost during development are difficult due to the lack of useful cost figures from previous projects and also due to the lack of an accurate cost estimation and management method. A cost estimation method to aid cost management is proposed. To support this method, 47 cost factors are defined. It is felt that the clear definition of these cost factors is of main importance for the usefulness of the method. The implementation of a cost data base which contains data about these 47 cost factors is discussed. This data must be gathered from current projects. The cost data base can ultimately be used to determine the constants of the proposed cost estimation method.

PAT-APPL-6-276 439 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Multiplexed MOS Multiaccess Memory System.
Patent Application,
Wesley Chu, and David G. Hibbits. Filed 22 Jun 81, 13p AD-D009 579/4
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Multiaccess memory modules are each connected by means of a bus to a system address multiplexer and to a system data multiplexer/demultiplexer. Each module includes a multiaccess memory connected to the system address multiplexer through a component address demultiplexer and a single bus for being addressed. Each multiaccess memory is also connected to the system data multiplexer/demultiplexer through a component data multiplexer/demultiplexer and a single bus for reading or sensing the memory and writing data into the memory. The memory cells of the multiaccess memory components consist of capacitor storage cells, also known as metal oxide silicon (semiconductor) (MOS) capacitors. (Author)

PB82-167263 CP **T99**
Office of Software Development, Falls Church, VA. Federal Software Testing Center.
The COBOL TCM (Test Coverage Monitor).
Software,
L. Arnold Johnson. 1982, mag tape GSA/DF-82/002
Source tape is in ASCII and EBCDIC character sets. Character set restricts preparation to 9 track, one-half inch tape only. Identify recording mode by specifying density and character set. Call NTIS Computer Products if you have questions.

The COBOL TCM is an invaluable aid in determining the degree to which a program has been tested. The TCM accepts as input a working COBOL program based on COBOL 68 or COBOL 74. It instruments the COBOL program through the addition of the source code necessary to measure the percent of the code executed in the COBOL. When the instrumented program executes, counters are used to save information regarding what parts of the program have been executed. When the program terminates, a report is produced by the instrumented code in the program. This report identifies the frequency of the execution of each paragraph, and all conditionally executed code. The code that was not executed is identified enabling the programmer to find areas of the program that will require additional testing. The TCM can help identify the exact percentage of the program that has been executed and pinpoint the areas that need the programmers attention. The TCM can also be used for other difficult tasks such as determining whether adequate test data is available for program conversion purposes. Software Description: There are two versions of the COBOL TCM: one written in the High-Intermediate level of COBOL 68 and the other written in the High-Intermediate level of COBOL 74. The TCM requires approximately 35k bytes of memory to execute. The instrumented program will require up to 50% more memory and take around 15% more time to execute. The instrumented program produced by the TCM is stand-alone in the sense that it needs no additional support in terms of work files or other software support in order to execute. It does produce the report described above. This product is available on most current generation equipment and can be tailored for systems for which it is not available for a reasonable fee by the Federal Software Testing Center.

PB82-192006 PC **E03**/MF **A01**
Office of Software Development, Falls Church, VA. Federal Software Testing Center.
The COBOL Test Coverage Monitor User's Manual.
May 81, 44p OSD/FCTC-82/015, GSA/DF-82/002A
For system on magnetic tape, see PB82-167263.

The COBOL TCM is an invaluable aid in determing the degree to which a program has been tested. The TCM accepts as input a working COBOL program based on the COBOL 68 or COBOL 74. It instruments the COBOL programthrough the addition of the source code necessary to measure the percent of the code executed in the COBOL. When the instrumented program executes, counters are used to save information regarding what parts of the program terminates, a

report is produced by the instrumented code in the program. This report identifies the frequency of the execution of each paragraph, and all conditionally executed code. The code that was not executed is identified enabling the programmer to find areas of the program that will acquire additional testing. The TCM can help identify the exact percentage of the program that has been executed andpinpoint the areasthat need the programmers attention. also be used for other difficult tasks such as determining whether adequate test data is available for program conversion purposes. The COBOL TCM is available for both COBOL 68 and COBOL 74 environements.

PB82-247420 PC **E06**/MF **E06**
Aarhus Univ. (Denmark).
Topics in Programme Specification and Design: Specification and Design of Distributed Systems.
Doctoral thesis,
I. H. Sorensen. Dec 81, 111p DAIMI/PB-141
Also pub. in ISSN-0105-8517.

This thesis presents a method for specifying, analyzing and refining the designs of distributed systems. Distributed systems are systems which consist of several autonomous process components. The characteristics of the specification method employed in this thesis can be summarized as follows - (1) The structure of a system's specification indicates the structure of the system's realization, (2) A design is specified entirely in terms of the permissibie activity across the interfaces between process components (i.e., the communications); such a specification gives the rules for the behavior of each process component and postpones decisions about its internal structure, (3) permissible activity is described in terms of predicates on the history of past communications. The specification method can be employed to describe systems in different degrees of detail, and it is demonstrated that a specification can evolve to a stage close to realization using a stepwise refinement method which ensures that the important properties are maintained.

PB82-251752 PC **A02**/MF **A01**
Technische Hogeschool, Delft (Netherlands). Onderafdeling der Wiskunde.
Parallel Language Recognition in Constant Time by Cellular Automata,
R. Sommerhalder, and S. C. van Westrhenen. Sep 80, 24p INFO-80/05

It is proved that the set of all languages accepted within a fixed, language dependent number of steps by deterministic one dimensional cellular acceptors is a proper subset of the set of all regular languages. A combinatorial condition is stated which is necessary and sufficient for a language to be recognizable in constant time by a deterministic one dimensional cellular automaton. It is shown that the question whether or not the language generated by a given context sensitive grammar is recognizable in constant time is algorithmically unsolvable. The question becomes solvable if a regular grammar is given. Finally it is proved that the set of all languages that can be accepted by nondeterministic one dimensional cellular acceptors is equal to the set of all regular languages. In conclusion some generalizations to n-dimensional languages and array languages are mentioned.

PB82-251760 PC **A02**/MF **A01**
Technische Hogeschool, Delft (Netherlands). Onderafdeling der Wiskunde.
An Exercise on Pumping,
R. Sommerhalder. Jan 79, 16p INF-79-1

The main purpose of this note is to collect a number of scattered properties, examples and unanswered questions concerning classes of languages which are proof against the regular-like pumping of words in the languages.

PB82-811274 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Text Editing. 1964-July 1982 (Citations from the NTIS Data Base).
Sep 82, 328p
Supersedes PB81-806366 and PB80-806714.

This bibliography of Federally-funded research presents citations covering automatic text editing and composing. Programming techniques are covered for applications such as report, index, and table generation, as well as list processing. (This updated bibliography contains 319 citations, 59 of which are new entries to the previous edition.)

PB82-873894 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Analog to Digital Converters. 1975-August, 1982 (Citations from the International Information Service for the Physics and Engineering Communities Data Base).
Rept. for 1975-Aug 82.
Aug 82, 131p

This bibliography contains citations concerning technology and application of analog to digital converters (ADC). Design and analysis of ADC are discussed. Applications include data acquisition, computerized instrumentation and monitoring. Performance and dynamic characteristics of ADC are presented. (Contains 118 citations fully indexed and including a title list.)

9C. Electrical and Electronic Engineering

AD-A117 873/0 PC **A02**/MF **A01**
Cold Regions Research and Engineering Lab., Hanover, NH.
Improving Electric Grounding in Frozen Materials.
Special rept.,
A. J. Delaney, P. V. Sellmann, and S. A. Arcone. Jun 82, 16p Rept no. CRREL-SR-82-13

This study shows that resistance to ground of a simple vertical electrode in frozen fine-grained soil can be lowered significantly by placing it in a hole backfilled with a conductive soil-salt mixture. These tests were performed near Fairbanks, Alaska, in perennially frozen silt. Three electrodes were installed in holes created by detonating standard military shaped charges placed at the ground surface. The backfill contained varying amounts of salt. Measurement of resistance to ground of each electrode was made seasonally. The resistance to ground was lowered by an order of magnitude by the addition of a water-saturated salt-soil backfill. Improvement persisted six months after the backfill was placed and allowed to freeze. The degree of improvement provided by this technique will be a function of grain size and permeability of the surrounding soil. (Author)

DE82008145 PC **A08**/MF **A01**
Commonwealth Associates, Inc., Jackson, MI.
Analysis of Storm-Related Outages and Restoration Measures, Washington, D.C. Metropolitan Area.
Dec 81, 164p DOE/RG/06674-T2
Contract ACC1-78RG06674
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This analysis contains a significant amount of data regarding the effects of storms on the electric utilities supplying electric power to customers in the Washington, D.C. metropolitan area, and can be summarized as follows: Available utility data suggests that the metropolitan Washington, D.C. area has experienced an increase in the severity of storms causing widespread damage to the utilities' distribution systems in 1978 and 1979; A review of the annual distribution system operation and maintenance expenses for the involved utilities show an increase for the 1975 to 1979 period after an allowance has been made for inflation, which is a positive indicator of the utilities' efforts to continue their operations and maintenance programs at a constant or improved level; All five utilities in the study area have established formal electric power restoration programs; and Utilities in the study area have installed or are planning to install Supervisory Control and Data Acquisition Systems (SCADA) on parts of their distribution systems. In order to allow the remote operation of circuit breakers, voltage regulating transformers and the acquisition of significant data such that a major outage condition is recognized. (ERA citation 07:046621)

DE82008648 PC **A02**/MF **A01**
Energy and Environmental Analysis, Inc., Arlington, VA.
Analysis of Standards for Energy-Efficient Motors.
Mar 81, 10p DOE/CS/40016-T5
Contract AC03-77CS40016

This analysis does not lead to a clear conclusion regarding the effectiveness of standards for energy efficient motors if effectiveness is based on a benefit-cost ratio criteria. Two alternative assumptions were made regarding the appropriate measure of the costs to the private sector. In the first case it was assumed that private sector users have no biases and expect rates of return on investment that represent their true opportunity cost of capital. Under this assumption the benefit-cost ratio is .65, that is, for every dollar of cost incurred, the associated benefit is 65 cents. The alternative assumption is tha the private sector under values energy conservation investments. Under this assumption, the benfit-cost ratio of the standards program was 1.35. For every dollar spent, $1.35 is returned to society, because the standards force private sector users to correct their biases and therefore allocate capital more productively. (ERA citation 07:047242)

DE82901853 MF **A01**
Ontario Hydro, Toronto.
Fault Analysis in Gas-Insulated Equipment. Final Report.
F. Y. Chu, S. A. Boggs, C. K. Law, and A. Williamson. Feb 82, 192p EPRI-EL-2248
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The results of a study on fault location techniques and damage analysis in Gas Insulated Substations (GIS) are presented. The objectives of the EPRI sponsored project are to gain a better understanding of in-service faults in GIS, to investigate the feasibility of thermal and electromagnetic techniques for locating faults and to develop prototype instrumentations for fault locations in GIS. The techniques developed and the information obtained in this project will be valuable to the maintenance engineer to plan for fast clean-up and repair after a fault, avoiding costly system downtime. The origins of the fast transient phenomena associated with initial breakdown of the gas and the thermal signature of the power arc after fault initiation in GIS were investigated with special emphasis to its application to fault location. The applications of an infrared, thermal imaging system and temperature sensitive paint to locate in-service faults with power follow-through were demonstrated, and an IR fault location system was developed. Both techniques are non-invasive and require no modification of existing GIS. Dynamic arc behaviour in a co-axial geometry and the thermal phenomena, such as pressure rise and enclosure burn-through associated with a power arc fault were investigated. A systematic framework to predict burn-through probability based on fault current distribution was developed. A discussion on the fault consequences and the damage assessment techniques is included. (ERA citation 07:043291)

DOE/ET/29355-T8 MF **A01**
Aluminum Co. of America, Alcoa Center, PA. Alcoa Technical Center.
Performance of a Technical and Economical Feasibility Study of an HVDC Compressed-Gas-Insulated Transmission Line. Technical Status Report No. 7, July-August 1980.
25 Sep 80, 12p
Contract AC01-79ET29355
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Progress in research on an HVDC compressed-gas-insulated transmission line is reported. The protective scheme, utilizing near-term projected MOV arresters, has been shown to be capable of achieving a 1300 kV BIL and a 1050 kV BSIL. Improvements have been made to the method of assembling the test model, in preparation for the large test model. Final test tanks are being fabricated. The test jig for the measurement of volume resistivity of the insulator has been completed. The prototype vertical leaf expansion joint was completed. Reasonable temperature rises were recorded during a free air heat rise test of the vertical leaf joint. The flexible copper leaves passed the first fatigue test. Additional testing is planned. The solder joint between the aluminum joint body and Alcuplate transition piece failed during fatigue testing. The design has been changed to eliminate the transition piece by nickel plating the aluminium joint body. The nickel plating will produce a better solder joint and should eliminate the failure. (ERA citation 07:043284)

N82-27559/5 PC **A02**
Societe Nationale Industrielle Aerospatiale, Les Mureaux (France).
Exposure of Structures on the Ground to an Electromagnetic Field Pulse Emitted by a Rectangular Horn Simulator Illumination de Structures au Sol Par Une Impulsion de Champ Electromagnetique au Moyen d'UN Simulateur de Type Cornet.
C. Rodiere, and M. Crochet. 1981, 6p SNIAS-821-422-112
Text in French. Presented at Coll. Sur la Compatabilite Electromagnetique, Lille, Jan. 1981.

The possibility of exposing a ground surface of several hundred square meters to an electromagnetic impulse plane wave front is analyzed. When evaluating the electromagnetic hardness of a system, the individual components are often studied, then the results are collected into a comprehensive model. Coupling effects can be overlooked. An electromagnetic field simulator, formed by two conductive sheets whose axis is vertical or oblique, is proposed. The test method determines on a macroscopic scale mean values for permittivity and conductivity parameters of the exposed surface.

9D. Information Theory

AD-A117 760/9 Not available NTIS
Georgia Inst. of Tech., Atlanta. School of Electrical Engineering.
A Survey of Methods for Iterative Signal Restoration,
Russell M. Mersereau, Monson H. Hayes, and Ronald W. Schafer. 1982, 7p ARO-17962.15-EL
Contract DAAG29-81-K-0024
Availability: Pub. in IEEE International Conference on Communications, v2 p3G.4.1-p3G.4.5, 1982 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A117 883/9 PC **A02**/MF **A01**
University of Southern California, Los Angeles. Dept. of Aerospace Engineering.
Distortion Rate Theory and Filtering.
Technical rept.,
R. S. Bucy. 27 Mar 80, 7p AFOSR-TR-82-0584
Grant AFOSR-76-3100
Pub. in IEEE Transactions on Information Theory, vIT-28 n2 p336-340 Mar 82.

No abstract available.

PB82-874090 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Error Detection Codes. 1970-August, 1982 (Citations from the NTIS Data Base).
Rept. for 1970-Aug 82.
Aug 82, 235p
Supersedes PB82-854779.

This bibliography contains citations concerning the design, development, and implementation of error detection codes for use in computer software and hardware. Topics include a discussion of their effectiveness, estimates of reliability gain, models and the state-of-the-art technology. Various applications such as error detection codes for binary data, picture signals, package failures, and detection and diagnosis of software malfunctions are also presented. (This updated bibliography contains 209 citations, 16 of which are new entries to the previous edition.)

9E. Subsystems

AD-A117 399/6 PC **A02**/MF **A01**
Harry Diamond Labs., Adelphi, MD.
Design of Microstrip Linear Array Antennas by Computer.
Conference paper,
Morris Campi. 18 Jun 82, 14p
Paper from the Proceedings of the Army Sciences Conference (1982), 15-18 Jun 82.

Today, computer aided design codes can be developed to help antenna engineers in their design of linear or planar array microstrip antennas. This report describes one such code that was developed by using both empirical data and a theoretical model. One major feature of this code is that it allows the designer to vary any one or more of the antenna design parameters and to observe the results, such as changes in the radiation pattern or amplitude distribution displayed at the computer terminal screen. This application provides the tool required by the engineer to determine in a matter of seconds the prime factors affecting his design and to make parametric adjustments or sensitivity studies to help understand and develop his final product. Once a design is established, the engineer is presented with a set of coordinate numbers that can be placed on magnetic or paper tape, which can then be used to fabricate the antenna on printed circuit board without the need for drawings or art-layout work and thus simplify the engineering process and reduce the time spent.

AD-A117 400/2 PC **A02**/MF **A01**
Army Communications-Electronics Command, Fort Monmouth, NJ.
Control of Parasitic Currents on Radiating Systems.
Conference paper,
Donn V. Campbell. 18 Jun 82, 10p
Paper from the Proceedings of the Army Sciences Conference (1982), 15-18 Jun 82.

In this paper, it has been clearly shown that induced parasitic rf currents can seriously degrade the performance of a radiating system; yet the significance of these undesired spurious currents has been largely ignored by antenna designers, and field users alike. It has been shown that parasitic currents can be effectively suppressed in both narrowband and wideband antenna systems by means of quarter-wavelength stubs (resonance method) and broadband cable chokes. Although effective current suppression techniques exist, further study is necessary to establish engineering design criteria and to extend state-of-the-art current suppression techniques to multi-octave antenna systems.

AD-A117 459/8 PC **A08**/MF **A01**
National Materials Advisory Board (NRC), Washington, DC.
An Assessment of the Impact of the Department of Defense Very-High-Speed Integrated Circuit Program.
Final rept.,
Jack St. Clair, Norman G. Einspruch, William G. Howard, Richard C. Levin, and Gerhard H. Parker.
Jan 82, 153p Rept no. NMAB-382
Contract N00039-80-C-0125

The technical and economic effects of the Department of Defense's (DoD) development program for very-high-speed integrated circuits (VHSIC) are examined. The probable effects of this program on the domestic aspects and international position of the integrated-circuit (IC) industry as they relate to the interests of the general public and the DoD are considered. The report presents a review of the unique DoD needs that motivate VHSIC research and development; an estimate of the degree of which these needs are likely to be met by the VHSIC program; a discussion of the effects of the program's demands for manpower, materials, and design and processing technologies; the problems connected with the program's technology export controls; and an assessment of the impact of the program on the structure of the U.S. integrated-circuit industry, its continued development and production of civilian consumer products, and its international competitive position. (Author)

AD-A117 567/8 PC **A04**/MF **A01**
Purdue Univ., Lafayette, IN. School of Electrical Engineering.
Fault Diagnosis of Nonlinear Analog Circuits. Volume I. DC Diagnosis of Hard Failures,
P. M. Lin, and Y. S. Elcherif. Jul 82, 62p Rept no. TR-EE-82-21
Contract N00014-81-K-0323
See also Volume 2, AD-A117 568.

The dc fault dictionary approach has been found very useful for locating hard failures (open circuits and short circuits) in nonlinear analog circuits. In this research project, we have introduced several new techniques to enhance the capability of the dc fault dictionary. Among our new results, the most significant ones are: (1) The use of the complementary pivot method to find test node voltages under all faults. (2) The set-up of the fault dictionary in the form of integer codes instead of test node voltages. The former technique makes it possible to rapidly analyze large circuits under all fault conditions. (Author)

AD-A117 568/6 PC **A07**/MF **A01**
Purdue Univ., Lafayette, IN. School of Electrical Engineering.
Fault Diagnosis of Nonlinear Analog Circuits. Volume II. A Multifrequency Method for Soft Failure Analysis,
L. Rapisarada, and R. DeCarlo. Jul 82, 134p Rept no. TR-EE-82-22
Contract N00014-81-K-0323
See also Volume I, AD-A117 567.

This report is a companion report (Volume II) of TR-EE-82-21. this volume describes multifrequency testing of interconnected analog circuits assuming soft failures. In particular the report details two approaches to soft failure multifrequency diagnosis: the composite system transfer function approach and the tableau approach. The two approaches are evaluated theoretically and numerically with the tableau approach shown to be far superior.

AD-A117 594/2 PC **A03**/MF **A01**
Martin Marietta Aerospace, Orlando, FL.
Automatic Test Methods for Linear Microcircuits.
Final technical rept. Jul 80-Jun 81,
Steve Broderick, and Hans Siepmann. May 82, 49p OR-16521, RADC-TR-82-115
Contract F30602-80-C-0184

The objective of this effort was to review MIL-M-38510 operational amplifier and comparator electrical test conditions, and to develop simplified test procedures of these parts on general purpose automatic test equipment. There was an emphasis on gain measurements. However, all parameters were investigated for implementation on ATE as well as the effects of accuracy, repeatability, and chip heating. Modifications to MIL-M-38510 slash sheets are recommended, as well as additions to same. (Author)

AD-A117 621/3 Not available NTIS
Texas Univ. at Austin. Dept. of Electrical Engineering.
Trapped Image Guide Leaky-Wave Antennas for Millimeter Wave Applications,
Tatsuo Itoh, and Bernd Adelseck. 8 Jul 80, 6p ARO-16171.14-EL
Grant DAAG29-78-G-0145
Availability: Pub. in IEEE Transactions on Antennas and Propagation, vAP-30 n3 May 82 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A117 696/5 PC **A04**/MF **A01**
Materials Research Labs., Ascot Vale (Australia).
A System for Computer-Aided Design of Printed Circuit Boards,
T. Pietsch. Apr 82, 54p Rept no. MRL-R-851
Errata sheet inserted.

A general purpose system for interactive computer-aided design of printed circuit boards is described. Included are details for encoding a circuit diagram in the computer, the placement of electronic component packages, the determination of a link/wire list and the routing of this list to obtain a wire layout. Design documentation in the form of component schedules and layout drawings are produced so that artwork can be generated on a Gerber drafting machine. A feature of the system is the method by which the routers find different size wire-paths on successive grids of increasing resolution. The use of this method approximately halves the routing time and increases the link connection rate by over 15%. (Author)

AD-A117 744/3 PC **A05**/MF **A01**
Technology Service Corp., Silver Spring, MD.
Ultralow Sidelobe Planar Near Field Measurement Study.
Final rept. 1 Jan-30 Jun 82,
K. R. Grimm. 30 Jun 82, 79p Rept no. TSC-W41-142/RAD
Contract N00014-82-C-0115

An analytic study has extended existing methods of estimating antenna pattern errors when testing by the method of planar near field probing. Improved error bounds are given for very low sidelobe levels based

only on the measured near field data and known tolerances due to probe positioning and multipath. These bounds are useful for certifying array performance independent of standard far field antenna range tests. They also can serve as improved design criteria for the construction of quality near field testing systems. An optimum probe for low sidelobe testing is shown to be one which minimizes its back scatter while simultaneously contributing minimum mean square error to the sidelobe region. That this is impossible for the commonly used dominant-mode waveguide probes is shown, and a recommendation is made to design an alternate probe based on single (or small array cluster) of radial mode dipoles. Finally, the feasibility of a highly thinned measurement/processing technique is shown using existing Navy-owned near field data from a moderate sidelobe array. The principle study recommendation is to confirm the improved error estimates developed herein by conducting a test of a qualified very low sidelobe array at the National Bureau of Standards, in order to demonstrate the fundamental limits of measurement accuracy of planar near field probing. (Author)

AD-A117 817/7 Not available NTIS
Georgia Inst. of Tech., Atlanta. School of Electrical Engineering.
The Horizontal Circular Loop Antenna Near a Planar Interface,
Lam N. An, and Glenn S. Smith. 26 Jun 81, 21p
ARO-15454.35-EL, ARO-17962.1-EL
Contracts DAAG29-78-C-0005, DAAG29-81-K-0024
Availability: Pub. in Radio Science, v17 n3 p483-502 May/Jun 82 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A117 823/5 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
A SAW Tapped Delay Line with Short (15-ns) Pedestal of Delay and High (>110 dB) Feedthrough Isolation.
Journal article,
Daniel E. Oates, and Richard W. Ralston. 1981, 5p
MS-5756, ESD-TR-82-034
Contract F19628-80-C-0002
Pub. in Ultrasonics Symposium, p44-47 1981.

No abstract available.

AD-A117 826/8 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Techniques for Electron Beam Testing and Restructuring Integrated Circuits.
Journal article,
David C. Shaver. 9 Jul 81, 5p MS-5558A, ESD-TR-82-025
Contract F19628-80-C-0002
Pub. in Jnl. of Vacuum Science and Technology, v19 n4 p1010-1013 Nov/Dec 81.

No abstract available.

AD-A117 861/5 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
High Performance Elastic Convolver with Extended Time-Bandwidth Product.
Journal article,
Iwen Yao. 1981, 6p MS-5752, ESD-TR-82-032
Contract F19628-80-C-0002, ARPA Order-600
Pub. in Ultrasonics Symposium, p181-185 1981.

No abstract available.

AD-A117 887/0 PC **A02**/MF **A01**
Rutgers - The State Univ., New Brunswick, NJ. Dept. of Computer Science.
The CRITTER System: Analyzing Digital Circuits by Propagating Behavior and Specifications.
Interim technical rept.,
Louis I. Steinberg, and Van E. Kelly. Jul 82, 19p Rept no. 4-25664
Contract N00014-81-K-0394, ARPA Order-4147

CRITTER is a system that reasons about digital hardware designs, using a declarative representation that can represent components and signals at arbitrary levels of abstraction. CRITTER can derive the behaviors of a component's outputs given the behaviors of the inputs, it can derive the specifications a component's inputs must meet in order for some given specifications on the outputs to be met, and it can verify that a given signal behavior satisfies a given specification. (Author)

N82-27603/1 PC **A04**/MF **A01**
Dornier-Werke G.m.b.H., Friedrichshafen (Germany, F.R.).
Metallization of CFRP Reflector. Phase 1.
Final Report.
R. Sippel, R. Wagner, J. D. Chauvy, J. C. Puippe, and K. Kuenzi. Aug 81, 73p ESA-CR(P)-1545
Contract ESA-4617/81/F-DD(SC)

The state of the art of electrochemical and physical metallization of CFRP sandwich reflectors is surveyed. Electrical, thermal, and test requirements are outlined. Of the electrochemical processes, direct metallization, or metallizing a mandrel then applying the CFRP are considered. Ion beam sputtering, aluminum flame spraying, and gluing are discussed. Electrical properties of metallizations can be assessed, using a resonator for high sensitivy measurements on small samples (during development) and with a radiometer for full scale tests. Analysis of electrical performance, mechanical and thermal properties and chemical behavior of test samples shows that indirect electromechanical plating, aluminum flame spraying and gluing of foil strips are promising techniques. Acoustic noise and thermal cycling tests are needed in order to decide between these processes.

N82-28184/1 PC **A11**/MF **A01**
Allgemeine Elektricitaets-Gesellschaft AEG Telefunken, Ulm (Germany, F.R.).
Matrix Display Panel Based on Gas Discharge Technology.
Final Report.
M. Schiekel, H. Suessenbach, W. Schwedes, H. Keiner, and G. Peppel. Mar 82, 244p BMFT-82-FB-T-039, ISSN-0340-7608
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

The components for a slim, gas discharge display panel of stacked tube geometry were developed and characterized for the presentation of color pictures. The technology of pulsed matrix display panels with a four-electrode configuration, having inherent memory, was considered. A breadboard model with maximum panel dimensions of 380 x 250 x 14 cu mm (70,000 pixels) was built. Results show that displays with long positive columns and conically shaped pixels give best brightness and efficiency values. The reliability of such display panels is considerably increased.

PAT-APPL-6-272 838 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Pasadena, CA. Pasadena Office.
General Logic Structure for Custom LSI Circuits.
Patent Application,
M. W. Sievers. Filed 12 Jun 81, 28p N82-25440/0, NASA-CASE-NPO-14410-2
Contract NAS7-100
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A general logic structure (GLS) for custom large scale integration (LSI) circuit substrates from which a plurality of negative ohmic resistance (NOR) gate logic circuits can be formed and interconnected to form more complex logic circuits is described. The GLS is formed so that a plurality of overlay masks defining cuts and contacts on the GLS transforms it into a specific custom logic circuit comprising a plurality of NOR gates. The overlay masks defining cuts and contacts can be computer generated, thereby providing a means whereby custom LSI cicuits can be rapidly manufactured, tested, and reconfigured at a minimum cost.

PATENT-4 301 419 Not available NTIS
Department of the Army, Washington, DC.
Parasitic Capacitance Compensation in CMOS-Switched Active Filter.
Patent,
Thomas J. Calomiris. Filed 13 Feb 80, patented 17 Nov 81, 9p AD-D009 541/4, PAT-APPL-6-121 181
Supersedes PAT-APPL-6-121 181, AD-D007 525.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Method and apparatus for compensation of switched resistance active filters to maintain a relatively constant Q and voltage gain by switching additional resistors in and out of the filter circuit. Solid state circuitry provides signals for activating switches to switch the compensating resistances as the operating frequency of the filter is altered. Compensation depends essentially on the number of open switches in the frequency of operation. An approximate approach reduces the number of resistances and switches needed for compensation, yet provides minimal error. (Author)

PATENT-4 305 078 Not available NTIS
Department of the Army, Washington, DC.
Multifrequency Series-Fed Edge Slot Antenna.
Patent,
Howard S. Jones, Jr., and Daniel H. Schaubert. Filed 15 Oct 79, patented 8 Dec 81, 7p AD-D009 544/8, PAT-APPL-6-084 686
Supersedes PAT-APPL-6-084 686.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A single input multifrequency antenna is disclosed which comprises a plurality of radiating elements connected in series. The device may comprise multiple conformal edge slot radiators. (Author)

PATENT-4 308 501 Not available NTIS
Department of the Army, Washington, DC.
Digital Peak Sensor.
Patent,
Thomas E. Tuccinardi, and Michael Conner. Filed 9 Oct 75, patented 29 Dec 81, 6p AD-D009 550/5, PAT-APPL-621 706
Supersedes PAT-APPL-621 706-75.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A digital circuit for sensing peaks exceeding a predetermined threshold in analog signals employs clock and control oscillators arranged such that their frequencies vary in opposite senses in response to changes in the sensed signal. The clock oscillator frequency is counted during sample intervals of durations which vary inversely with the control oscillator frequency. A count increase (or decrease) of predetermined amount from one sample interval to the next, followed by a count decrease (or increase) from another sample interval to the next, results in an output signal. In a preferred embodiment, the clock frequency is counted in an up/-down counter which, for each sample interval, is counted up and down for equal numbers of control oscillator cycles. The net count at the end of a sample interval is therefore an indication of the magnitude and polarity of changes in the sensed signal. In a particular utilization the circuit serves in a mine fuze and senses the peak of a magnetic field signal such as is associated with a tank or other vehicle. (Author)

PATENT-4 321 549 Not available NTIS
Department of the Navy, Washington, DC.
Switching Quadrature Detector.
Patent,
James P. Hansen. Filed 6 May 80, patented 23 Mar 82, 4p AD-D009 527/3, PAT-APPL-6-147 413
Supersedes PAT-APPL-6-147 413, AD-D007 314.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A quadrature detector werein the I and Q quadraturely related signals are produced and processed in the same channel rather than parallel channels. A local oscillator feeds a 90 degrees phase splitter which produces a pair of quadrature signals. These are alternately fed to a balanced modulator for mixing with an input R.F. signal. The sum and difference frequency signals are fed through a low-pass filter which passes only the I and Q difference-frequency signals. These are then separated to provide two output signals corresponding to quadrature components of the input R.F. signal. (Author)

PATENT-4 323 855 Not available NTIS
Department of the Army, Washington, DC.
MIC Combiner Using Unmatched Diodes.
Patent,
Horst W. A. Gerlach. Filed 9 Apr 80, patented 6 Apr 82, 7p AD-D009 540/6, PAT-APPL-6-138 477
Supersedes PAT-APPL-6-138 477, AD-D007 521.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licens-

ing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

In a microstrip circuit having dual diode driven, independently oscillating, half-wave open ring resonating sections, partially coupled quarter-wave ring sections are provided to permit matching and tuning of diodes having dissimilar negative impedances. The quarter wave ring sections are combined with appropriate line sections to accommodate the negative impedance devices. The diode circuits are connected to the low impedance points of the oscillating ring sections by the quarter-wave ring sections. Appropriate terminations to ground are provided to suppress possible oscillations in a bias circuit. Second and third harmonic traps are provided for use with TRAPATT diodes. Ground lines are provided to reduce circuit unbalance in the event of drastic power changes occuring on either side of the circuit which may other wise result in odd mode operation. Slots are provided to suppress an undesired transverse resonance mode in the line sections accommodating the negative impedance devices. (Author)

PATENT-4 326 778 Not available NTIS
Department of the Army, Washington, DC.
Acousto-Optic Time Integrating Correlator.
Patent,
Norman J. Berg, Michael W. Casseday, John N. Lee, and Irwin J. Abramovitz. Filed 12 May 80, patented 27 Apr 82, 7p AD-D009 531/5, PAT-APPL-6-148 653 Supersedes PAT-APPL-6-148 653, AD-D007 902.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A highly efficient time integrating acousto-optic correlator which determines the time difference of arrival of the signals being correlated as well as the center frequency and bandwidth of the signals. A surface acoustic wave delay line is provided with two counter-propagating surface acoustic waves with wavefronts tilted with respect to each other. Two laser beams are directed across the propagating waves with an angle of 4 theta (Beta) between them where theta (Beta) is the Bragg angle, so that one beam interacts primarily with one propagating wave while the other beam interacts primarily with the other wave. The modulated optical beams are directed to a time-integrating photodetector means which provides a signal output corresponding to the correlation function. (Author)

PB82-234030 PC **A04**/MF **A01**
Sentralinstitutt for Industriell Forskning, Oslo (Norway).
Konsruksjon av Integrerte Kretseri NMOS (Designing NMOS Integrated Circuitts).
Jan Haraldsen. 31 Dec 81, 63p 81-02-20-4, ISBN-82-7267-424-6
Text in Norwegian.

This report describes layout routines for desinging integrated circuits in NMOS technology, by utilizing a CALMA interactive layout system. Some typical NMOS circuitelements are described and shown is also an example of circuit analysis with the analysisprogram SPICE. A design rute check program according to designrules given in 'Integrated Circuit Design and Procurement Manual, NMOS, Silicongate', is described.

PB82-249707 PC **A04**/MF **A01**
Fraunhofer-Gesellschaft zur Foerderung der Angewandten Forschung e.V., Freiburg im Breisgau (Germany, F.R.). Inst. fuer Angewandte Festkoerperphysik.
Semiconductor Technology for VLSI: Plasma Etching and High-Pressure Oxidation.
Konrad Eisele. Jul 82, 73p BMFT-FB-T-81-115
Trans. of mono. Halbleitertechnologien fuer Grossintegration - Gasatztechnik und Hochdruckoxidationen, n.p., Aug 81. See also N82-15304.

The large scale integration of electronic circuits on silicon requires etching of structures in the range of 1 micrometer or smaller. This cannot be achieved by wet chemical means. Dry etching processes, however, do produce an exact replica of the desired structure in those materials which are common in silicon planar technology. These procedures depend on the RF-energy, on how this is coupled to the substrate to be etched, and on the pressure. They are, accordingly, called plasma etching or reactive ion etching. Their etch rate and selectivity of the relevant materials for various gases was examined. MOS properties can be restored to their original level by annealing. The design of a practical etch reactor is outlined.

PB82-254061 PC **A05**/MF **A01**
Allgemeine Elektricitaets-Gesellschaft AEG Telefunken, Heilbronn (Germany, F.R.). Geschaftsbereich Halbleiter.
Design Methods for Complex MOS Systems.
Final rept.,
Paul Sieber. Aug 82, 77p BMFT-FB-T-80-086
Trans. of unidentified German mono., Aug 80. See also N81-24370.

Methods and aids to design complex MOS systems were improved and tested on prototypes of new LSI components. The extension of the cell libraries for both manual and computer layouts resulted in reduced development time. By improvements in circuit design the yield of the CP3F microprocessor and the ultrasonic remote control chips was enhanced. Fundamentals of LSI testing with automated test systems were widened and by standardization of the procedures a shorter development time for new test programs and a better evaluation of components and test structures was achieved. Test programs for current products were optimized with respect to testing time. The introduction of the new n-channel Si gate process was prepared by designing and testing special test structures.

PB82-873225 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Testing of VLSI Circuits. 1975-August, 1982 (Citations from the International Information Service for the Physics and Engineering Communities Data Base).
Rept. for 1975-Aug 82.
Aug 82, 156p
Supersedes PB81-880353.

This bibliography contains citations concerning various techniques and devices for testing VLSI performance or operation and for detecting and analyzing VLSI failure or faults. Both functional and in-circuit testing are discussed. Statistical and practical aspects of testing methods are presented. (This updated bibliography contains 153 citations, 81 of which are new entries to the previous edition.)

PB82-873233 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Low Noise Amplifiers and Preamplifiers. 1975-August, 1982 (Citations from the International Information Service for the Physics and Engineering Communities Data Base).
Rept. for 1975-Aug 82.
Aug 82, 238p
Supersedes PB81-881443.

This bibliography contains citations concerning the design, development, construction, characteristics, and performance of a variety of low noise amplifiers and preamplifiers and associated circuits. Considerable attention is given to GAAS FET amplifiers and preamplifiers including circuit designs, physical temperatures, high-speed performance, and reliability. (This updated bibliography contains 244 citations, 42 of which are new entries to the previous edition.)

10. ENERGY CONVERSION (NON-PROPULSIVE)

10A. Conversion Techniques

DE82000720 MF **A01**
Solar Energy Research Inst., Golden, CO.
Proceedings of Facility Operators and Experimenters Workshop.
1979, 179p SERI-0637-16, CONF-790570-
Contract AC02-77CH00178
Solar Thermal Test Facility Users Association experiments workshop, Albuquerque, NM, USA, 3 May 1979, Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

Separate abstracts were prepared for 15 papers in these proceedings. Also included is a paper previously abstracted for EDB, some opening remarks, and a summary of panel discussions.

DE82005122 PC **A08**/MF **A01**
Argonne National Lab., IL.
National Implications of Solar Futures. A TASE Project Report.
Nov 81, 154p DOE/EP-0025
Portions of document are illegible.

Two potential solar energy futures for the US in the year 2000 are analyzed and compared in the context of high overall national energy growth (118 quads) which is compatible with the upper range of the National Energy Plan. One scenario is a low solar growth scenario wherein solar and biomass technologies contribute the equivalent of 6 quads or 5% to total national energy supply. The other scenario is a high solar growth scenario wherein solar and biomass technologies contribute the equivalent of 14.2 quads or 12% of total national energy supply. The results and synthesis of several studies which analyzed and compared the environmental and socioeconomic implications of these potential futures at national, regional, and community levels are presented. Detailed discussions of the project itself, the construction of the scenarios, and each analysis contributing to the study are included. These analyses are: air quality; water quality; water and land resources; indirect emissions; economic, employment, and materials resource; and institutional framework. (ERA citation 07:042735)

DE82007911 PC **A04**/MF **A01**
Central Wayne County Sanitation Authority, Dearborn Heights, MI.
Energy Recovery and Cogeneration from an Existing Municipal Incinerator: Phase IIA Progress Report on Final Design.
Feb 82, 70p DOE/CS/20232-2
Contract FG01-79CS20232
Portions of this report are illegible.
Microfiche only after original copies are exhausted.

A feasibility study was prepared on energy recovery and cogeneration from and existing municipal incinerator in Wayne County, Michigan. The mechanical, electrical, structural, and instruments an controls equipment designs were established in sufficient depth to arrive at a construction cost estimate. The designs are described. All of the flue gas generated from each incinerator is directed into a waste heat boiler that will generate steam. A waste heat boiler will be provided for each of the three incinerators. Steam from these waste heat boilers will supply energy to two turbine-generators, which, in turn, will supply auxiliary power to the incinerator plant; the balance of the power will be sold to Detroit Edison Company (DEC). Exhaust steam from each turbine will be directed into a surface condenser operating under vacuum. The water to be supplied to each condenser will be recirculated water that has been cooled by means of a cooling tower. Other cooling water that could be subjected to oil contamination will be supplied from a separate recirculating water system. The water in this system will be cooled by an evaporative condenser. The main steam, boiler feedwater, and condensate systems will be similar to those used in central power stations. Flow diagrams for all systems, together with heat balances, electrical one-line diagrams, and plant layouts, are included in the Appendix. Also included in the Appendix are instruments and controls logic diagrams. (ERA citation 07:044092)

DE82007992 PC **A03**/MF **A01**
Sandia National Labs., Livermore, CA.
Contour-Measuring Device for Solar Mirrors.
V. P. Burolla. Feb 82, 34p SAND-82-8202
Contract AC04-76DP00789
Portions of document are illegible.
Microfiche only after original copies are exhausted.

An inexpensive device for measuring the contour or focal length of large mirrors (1.5 m x 3.5 m) with relatively long focal lengths (about 500 m) is described in detail. Calibration procedures, measurement techniques and performance parameters such as repeata-

bility and temperature dependence, are also included. The data acquisition system and computer program used is described along with options for even less costly systems. Recommendations are made for improvements to the prototype device, and for its use in a production environment. (ERA citation 07:046413)

DE82008074 PC **A03**/MF **A01**
Kaiser Aluminum and Chemical Corp., Pleasanton, CA. Center for Technology.
Energy Savings Through the Use of an Improved Aluminum Reduction-Cell Cathode. Technical Progress Report, April 1, 1981-June 30, 1981.
R. C. Dorward, and J. R. Payne. 22 Sep 81, 36p DOE/CS/40215-T7
Contract AC03-76CS40215
Microfiche only after original copies are exhausted.

The principal project goal is to develop a Hall cell cathode that will reduce the specific energy consumption of existing commercial cells by 20 to 25%. The use of titanium diboride (TiB sub 2), a material that is wetted by molten aluminum, as the cell cathode, provides a stable cathode surface, thereby allowing the cell to be operated at a smaller anode-cathode distance (ACD). Energy savings arise as a result of reduced resistive losses through the cryolite electrolyte. The program is comprised of three integrated parts: (1) materials characterization, (2) pilot cell testing, and (3) a full-sized cell demonstration. Emphasis was placed on electrolysis and corrosion tests pertinent to a top-entering cathode lead system. Progress was also made on the design of the 40 KA pilot cell, development of the cathode lead-TiB sub 2 joint, and materials characterization. Electrolysis tests show that operating temperatures below about 870 exp 0 C are impractical because the decomposition potential is too high. Electrolysis at 870 exp 0 C or higher requires protection of the top-entering cathode connection from corrosion. (ERA citation 07:047246)

DE82008105 PC **A05**/MF **A01**
Oak Ridge National Lab., TN.
Survey of Selected Local Government Energy Emergency Planning Programs.
M. V. Adler, and V. A. Honkala. Mar 82, 88p ORNL/TM-7976
Contract W-7405-ENG-26
Portions of this report are illegible.

This preliminary study assessed the status of energy emergency planning of a selected group of local governments, determined their needs for technical assistance in this area, and identified materials available for their use. One hundred thirty-eight local governments were asked about their energy emergency plans in a survey conducted in February 1981. Forty-seven governments of various jurisdiction sizes and geographic locations responded. More planning has been done by the responding local governments for shortages of gasoline and other petroleum products than for electricity, natural gas, or coal. Many local governments have counted on petroleum allocations and the state set-asides under the Emergency Petroleum Allocations Act of 1973 to meet their requirements for essential public services and to assist hardship cases. The expiration of this act on September 30, 1981, the emphasis of the current administration on handling supply shortages through the free market system, and increased prices for energy supplies will force local governments to take new approaches to energy emergency planning. In general, the plans analyzed deal with fuel shortages through conservation, fuel stockpiles, and curtailment of low-priority services. The local governments studied plan to rely primarily on federal, state, and utility/supplier measures in the private sector where local authority is limited. The study suggests that local governments need information within the next year on establishing and operating data systems that provide information on fuel supplies and consumption; developing management plans; developing plans for implementing and enforcing conservation measures; and assessing the economic, social, and environmental impact of measures. (ERA citation 07:047098)

DE82008487 PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Photovoltaic off-Farm Agricultural Applications: Final Report. Volume I. Executive Summary.
W. F. Adolfson. Feb 82, 49p SAND-81-7175/1
Contract AC04-76DP00789
Portions of document are illegible.

The off-farm agricultural industry, which includes food processing, agricultural chemicals, tobacco and alcohol fuels, consumes about 2 percent of the United States energy supply for direct heat and mechanical power. Photovoltaic energy systems can cut energy costs in many of these industrial applications, although early market penetration may be hampered by certain market barriers. The major off-farm agricultural applications and photovoltaic system options available for supplying electricity and low-temperature heat required by these industries are highlighted. (ERA citation 07:042893)

DE82009152 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Some Issues Concerning the Use of Projected Input-Output Coefficients.
P. J. Groncki. 1981, 19p BNL-30893, CONF-811236-1
Contract AC02-76CH00016
Workshop on assessing health impacts of energy technologies at the regional or national levels, Upton, NY, USA, 7 Dec 1981.

This paper briefly discusses the use of input-output tables in technology assessment, R and D planning, and policy analysis. The use and importance of projected coefficient matrices and some of the various techniques for generating them are discussed. The shortcomings of the fixed coefficient assumption are treated in some detail to shed light on the implications of the various approaches to projecting coefficient tables. Several of the more formal adjustment techniques are also presented. The limitations of these projection techniques are discussed. (ERA citation 07:043793)

DE82009476 PC **A06**/MF **A01**
Southern Solar Energy Center, Atlanta, GA.
Wind Energy Feasibility Assessment for the US Virgin Islands.
D. E. Ball. Sep 81, 110p SSEC/TP-31262
Contract AC02-79CS30166

Separate abstracts were prepared for 2 reports in this collection. A third report was treated separately. (ERA citation 07:043184)

DE82009487 PC **A04**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Heat Rejection and Energy Extraction within Solar Ponds.
Y. Jaluria. Feb 82, 56p SERI/RR-252-1393
Contract AC02-77CH00178
Portions of document are illegible.

A study of the heat transfer and fluid flow processes governing heat rejection to the surface layer and energy extraction from the storage zone has been carried out. The literature available on this and other related problems was studied in detail to determine the nature of the recirculating flows that arise and the effect they might have on the stability of the gradient layer. Simplified analytical models were considered to determine the governing parameters and their effect on the performance and efficiency of the solar pond. Estimates of the surface temperature rise and the increase in evaporation caused by heat rejection were made. Two flow configurations, end-to-end and top-to-bottom, were considered for every extraction and the spread of the flow in the storage zone was studied. It was found that the limited penetration of the top-to-bottom configuration restricts its satisfactory operation to small ponds. The experimental modeling of the flows under study was considered in terms of the governing parameters and it was found that the top-to-bottom configuration cannot be uniquely modeled. The choice of these parameters for a full-size pond is also discussed. (ERA citation 07:046414)

DE82009499 PC **A02**/MF **A01**
Southern Solar Energy Center, Atlanta, GA.
Rosewood Plantation Project: A Summary Report.
C. B. Porter. Oct 81, 19p SSEC/TP-41287
Contract AC02-79CS30166
Portions of document are illegible.

Rosewood Plantation, a multifamily condominium development located in north Atlanta, Georgia combined various energy conserving and passive solar features. Interviews with both the project architect and the developer to get their views on the condominium project in retrospect, to gain a sense of their plans to apply energy conservation and passive solar techniques to other developments, and to discuss their views of the market for passive solar in multifamily developments are summarized. Included in appendices are: thermal performance-winter 1980-1981, site plan, monthly energy consumption graph, and floor plans and photographs. (ERA citation 07:044007)

DE82009568 PC **A02**/MF **A01**
Southern Solar Energy Center, Atlanta, GA.
Summary: Third FY 1980 Project Meeting, July 31-August 1, 1980.
1980, 20p SSEC/WP-33149, CONF-8007135-Sum.
Contract AC02-79CS30166
FY'80 project meeting on the state solar support project, Atlanta, GA, USA, 31 Jul 1980.

The following are summarized briefly: state agency presentations, round table, Southern Solar Support project matters, a report on the Southern States Energy Board, technology review: solar hot water systems, a commercial solar application, film preview, and the utility interface with solar. A list of participants is included. (ERA citation 07:042727)

DE82009584 PC **A03**/MF **A01**
Southern Solar Energy Center, Atlanta, GA.
Economic Feasibility of Wind Energy for the US Virgin Islands.
D. E. Ball, D. M. Boyd, S. C. Nelson, and L. E. Smith. Jun 81, 26p SSEC/TP-31261
Contract AC02-79CS30166
Portions of document are illegible.

A preliminary assessment of the economic feasibility of wind energy conversion systems (WECS) for the US Virgin Islands is presented. The current and near-term economics of available WECS for residential, commercial, and wind farm applications were analyzed. The sensitivity of WECS economic worth to a variety of factors was also investigated. Preliminary conclusions highlighted the favorable economics regarding larger, commercial, and wind farm scale machines. (ERA citation 07:043904)

DE82009925 PC **A05**/MF **A01**
Agricultural Research Service, Bushland, TX. Conservation and Production Lab.
Wind Energy for Irrigation: Wind-Assisted Pumping from Wells. Final Report.
R. N. Clark, A. D. Schneider, V. Nelson, E. Gilmore, and R. E. Barieau. Jan 81, 77p DOE/SEA-7315-20741/81/3
Contract AI01-76ET20319
Portions of document are illegible.

Work is reported on a project whose objectives were: to assemble a complete wind-powered pumping system for irrigation wells in the Southern Great Plains; to adapt or modify existing pumping equipment so that it could effectively be powered by a vertical-axis wind turbine; to develop a data collection system for collecting, recording and processing on-site wind data and mechanical, electrical and hydraulic systems data; to combine data from all systems in an overall analysis that will permit an engineering evaluation of the complete system; to develop a dynamic mathematical model of the pumping system which includes the most appropriate model of the vertical-axis wind turbine; and to make an economic analysis of the wind-powered pumping system and construct a model for predicting the economics of such systems in general. The pumping system uses both a vertical-axis, or Darrieus, wind turbine designed to produce 40 kW in a 15 m/s wind and an electric motor to power a conventional vertical-turbine irrigation pump. The wind turbine furnishes power to the pump only when the windspeed exceeds 6 m/s and is used to reduce the load on the electric motor rather than to replace the motor. The wind-assisted pumping system and its operation are described, as is the data collection system, and the results of the performance data analysis for the wind turbine and the pumping system are discussed. The system's annual energy output is predicted, and the economics are analyzed.

DE82009952 MF **A01**
DHR, Inc., Washington, DC.
Solar Energy Policy Review.
17 Aug 78, 328p DOE/PR/01322-T1
Contract AC01-78PR01322
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

A number of memoranda and reports are collected which deal with evaluations of solar energy policy op-

tions, including direct and indirect labor impacts and costs of different options and consumer protection. (ERA citation 07:042747)

DE82010402 PC **A02**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Economic and Performance Potential of Selected Improvements to Parabolic Troughs.
R. C. Gee, and L. M. Murphy. Jan 82, 8p SERI/TP-632-1319, CONF-820410-4
Contract AC02-77CH00178
ASME solar energy conference, Albuquerque, NM, USA, 26 Apr 1982, Portions of this report are illegible. Microfiche only after original copies are exhausted.

Improved parabolic trough concentrating collectors will result from better design, improved fabrication techniques, and the development and use of improved materials. An easily applied methodology is presented and implemented that quantifies the performance potential of selected parabolic trough component improvements from a systems viewpoint and uses performance data to determine the economic value of each improvement. Specifically considered are evacuated receivers, silvered glass reflectors, improved receiver selective coatings, higher optical accuracy concentrators, and higher transmittance receiver glazings. Upper-bound costs for each improvement are provided as well as estimates of the increased solar energy system rates of return made possible by these improvements. The performance and economic potentials of some of these improvements are substantial, especially at higher collector operating temperatures. (ERA citation 07:046417)

DE82011256 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Effect of Yaw on Horizontal-Axis Wind-Turbine Loading and Performance.
J. C. Glasgow, R. D. Corrigan, and D. R. Miller. 1981, 21p DOE/NASA/20320-35, NASA-TM-82778, CONF--811043--19
Contract AI01-76ET20320
Biennial wind energy conference and workshop, Washington, DC, USA, 5 Oct 1981, Portions of this report are illegible.

Tests were conducted on the Mod-0 100 kW Experimental Wind Turbine to determine the effects of yaw on rotor power, blade loads and teeter response. The wind turbine was operated for extended periods at yaw angles up to 49 exp 0 to define average or mean response to yaw. As a result of the tests it was determined that the effect of yaw on rotor power can be approximated by the cube of the velocity normal to the rotor disc as long as the yaw angle is less than 30 exp 0 . Blade bending loads were relatively unaffected by yaw, but teeter angle increased with wind speed as the magnitude of the yaw angle exceeded 30 exp 0 indicating a potential for teeter stop impacts at large yaw angles. No other adverse effects due to yaw were noted during the tests. (ERA citation 07:050051)

DE82011564 MF **A01**
Structural Composites Industries, Inc., Azusa, CA.
Design, Evaluation, and Fabrication of Low-Cost Composite Blades for Intermediate-Size Wind Turbines.
O. Weingart. Sep 81, 210p DOE/NASA/0100-1, NASA-CR-165342, SCI--81520
Contract AI01-76ET20320
Portions of document are illegible.
Available in microfiche only.

The low-cost composite blade program is described, involving design, evaluation and fabrication of a pair of low-cost composite rotor blades (LCCB) for the MOD-0A wind turbine. The objectives of the program were to identify low cost approaches to the design and fabrication of blades for a two-bladed 200 kW wind turbine and to assess the applicability of the techniques to larger and smaller blades. In Phase I of the program, several blade designs were developed to the point where reasonably accurate estimates could be made of the structural properties and costs of tooling and fabrication. The most cost-effective design was selected for detailed design in Phase II. Structural analysis of the selected design was performed, with assistance from NASA in some of the more specialized techniques (e.g. flutter analysis). Subelement and subscale specimens were fabricated in Phase I for testing. Blade tooling was designed and fabricated. Major items included a 60 ft D-spar mandrel and its supports, a 60 ft cure oven with a 200 kW heater, and a transverse filament tape (TFT) pre-impregnation station. Two complete blades and a partial blade for tool tryout were built. A 100 ft long ring-winder machine was designed and built. (ERA citation 07:046542)

DE82011688 PC **A13**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Solar-Collector Materials Exposure to the IPH Site Environment. Final Report.
V. L. Morris. Jan 82, 294p SAND-81-7028/2
Contract AC04-76DP00789
Portions of document are illegible.
Microfiche only after original copies are exhausted.

In-situ environmental exposure tests were conducted at nine proposed intermediate-temperature Industrial Process Heat (IPH) sites. Three types of reflector materials were evaluated for survivability at the nine sites: second-surface silvered glass, aluminized acrylic FEK-244 film on aluminum substrate, and Alzak (electropolished aluminum) on aluminum substrate. Black chrome absorber material and low-iron float glass were evaluated for thermal, photochemical, and environmental degradation. The reflector specimens were monitored for decreases in specular and hemispherical reflectance due to soil buildup. The absorber material was evaluated for changes in solar absorptivity and emissivity, and the float glass was monitored for changes in transmissivity. Surface and subsurface defects on all materials were examined microscopically and, where deemed of note, were documented photographically. (ERA citation 07:046375)

DE82011932 PC **A13**/MF **A01**
Sandia National Labs., Livermore, CA.
Department of Energy Solar-Central-Receiver Annual Meeting.
Feb 82, 297p SAND-82-8002, CONF-8110176-
Contract AC04-76DP00789
Department of Energy solar central receiver annual meeting, Claremont, CA, USA, 13 Oct 1981, Portions of document are illegible.
Microfiche only after original copies are exhausted.

Separate abstracts were prepared for 33 papers in these proceedings. Also included is a list of Central Receiver Test Facility projects. (ERA citation 07:046313)

DE82012010 PC **A02**/MF **A01**
Naval Research Lab., Washington, DC.
Solar Receivers for Thermochemical Energy Conversion Using Sulfur Oxide Chemistry. Final Report.
T. A. Chubb, J. J. Nemecek, and D. E. Simmons.
Sep 81, 17p DOE/ET/20339-T1
Contract AI01-77ET20339

The feasibility of collecting solar energy by converting high temperature heat into chemical energy using SO sub 3 dissociation was demonstrated by laboratory simulation. Gapped spiral receiver elements were tested using electrical heaters. SO sub 3 dissociation was demonstrated at operational flow velocities in both metal and quartz tube-in-tube receiver element designs. Adequate reactivity was obtained using commercial platinum on aluminum oxide catalysts. The program materially contributed to a first demonstration of closed-loop thermochemical energy transport using reforming/methanation chemistry. (ERA citation 07:042780)

DE82012011 MF **A01**
JBF Scientific Corp., Wilmington, MA.
Northeast Regional Assessment Study for Solar Electric Options in the Period 1980 to 2000.
Apr 81, 330p DOE/ET/20275-1
Contract AC06-77ET20375
Portions of document are illegible.
Available in microfiche only.

The demography and economic activity of the Northeast Region are described and a brief regional energy overview is given. The general physiographic setting is described and the insolation, wind resource, and market for OTEC products are assessed. The results of the analysis to determine the market potential for central station utility applications in the Northeast for solar electric technologies in the period from 1980 to 2000 are presented. Also addressed are the mechanisms by which the Federal Government could accelerate, or increase, the penetration of solar electric devices in the region. The performance and economics of solar electric systems for dispersed users are presented. User viewpoints and institutional factors are examined. The market potential is estimated for dispersed solar electric systems in the Northeast. Utility solar electric values are summarized. General description of economic models of dispersed user applications and one detailed report findings are appended. State solar legislation abstracts are included. State energy office activities are summarized and regional agencies are listed.

DE82012057 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Midtemperature Solar Systems Test Facility Predictions for Thermal Performance Based on Test Data of Low- to Medium-Temperature Line-Focusing Solar Collectors. Whiteline Model W-11A Collector.
T. D. Harrison. Feb 82, 23p SAND-82-0092/4
Contract AC04-76DP00789
Microfiche only after original copies are exhausted.

Thermal performance predictions based on test data are presented for the Whiteline Model W-11A solar collector for three output temperatures at eight cities in the United States. (ERA citation 07:043060)

DE82012195 PC **A02**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Geothermal Applications for Highway Rest Areas.
J. A. Strawn, and I. A. Engen. Feb 82, 20p EGG-GTH-5574
Contract AC07-76ID01570

A feasibility study, made for the South Dakota Department of Transportation, regarding geothermal applications for highway rest areas is described. This preliminary information indicated that the retrofit of the heating systems in the rest area structures was feasible. Specific design assumptions, equipment selections, costs, and other data are reported. This information is conceptual in nature. (ERA citation 07:043172)

DE82012207 MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Area- and Site-Specific Geothermal Leasing/Permitting Profiles; Updated Geothermal Leasing/Permitting Performance Assessment.
G. V. Beeland, E. Schumann, and M. Wieland. Feb 82, 316p EGG-2166
Contract AC07-76ID01570
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

Sufficient discussion of the elements of the leasing and permitting programs is included to place the information developed in proper context. A table and process flow diagram developed previously which outline the steps in the non-competitive leasing process, is reprinted. Computer printout profiles are presented on 195 identifiable areas in the following states: Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming. Sufficient information on the boundaries of these areas is contained in the report to permit identification of their general location on any map of the appropriate state which shows township and range locations.

DE82012282 PC **A06**/MF **A01**
Western Solar Utilization Network, Portland, OR.
Utah Renewable Energy Directory.
Nov 81, 110p WSUN-132
Contract AC02-79CS30159

A compilation of fifteen statewide (Utah) solar projects, one project on use of a ground water heat pump, and one on a state conservation funding project is presented. Information on the name of the sponsoring organization of the project, its type, location, funding source, cost, and a description is included. A consumer's guide to buying solar energy systems, a list of attorneys involved in environmental and/or energy law, information on financial aids and incentives for solar equipment, and additional sources of energy on solar energy systems are also included.

DE82012291 PC **A05**/MF **A01**
Bonneville Power Administration, Portland, OR.
Results of the Bonneville Power Administration Weatherization and Tightening Projects at the Midway Substation Residential Community.
J. B. Dickinson, D. T. Grimsrud, D. L. Krinkel, and R. D. Lipschutz. Feb 82, 79p LBL-12742

Contract AC03-76SF00098

As part of a regional conservation program, the Bonneville Power Administration retrofitted 18 houses at its Midway substation in central houses were divided into three groups, or cells. During the first year of the project, enery consumption was monitored but no changes were made to the houses. Prior to the second year of the project, Cell 2 received attic and crawlspace insulation, foundation sill caulking, and increased attic ventilation. Cell 3 received these retrofits plus storm windows and doors, and Cell 1 serves as the control group. Before the beginning of the project's third year, each house in Cell 1 received 22 hours of infiltration reduction weatherization or house tightening. Each house in Cell 3 received 10 hours of this same type of weatherization. Cell 2 served as the control group for the house doctoring phase of the project. Energy consumption and weather data were monitored for the entire three year period. Before and after each set of retrofits, leakage area allowing calculation of heating season infiltration rates. An energy use model correlating energy consumption with outside temperature was developed in order to determine improvements to the thermal conductance of the building envelope as a result of the retrofits. Energy savings were calculated based on the results of the energy use model and, as a check on these findings, th Computerized Instrumented Residential Analysis (CIRA) load calculation program provided a theoretical estimate of the savings resulting from the retrofits.

DE82012339 PC **A03**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Technology Assessment of Solar-Energy Systems: Part I. AN Analysis of Life-Cycle Costs of Solar Facilities. Part II. Minerals Critical to the Development of Future Energy Technologies in High and Low Solar Scenarios.
J. Sathaye, and H. Ruderman. Sep 81, 49p LBL-13324
Contract AC03-76SF00098

Two papers are included. A separate abstract was prepared for each paper. (ERA citation 07:043898)

DE82012432 MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Effect of Rotor Configuration on Guyed Tower and Foundation Designs and Estimated Costs for Intermediate-Size Horizontal-Axis Wind Turbines.
G. R. Frederick, J. R. Winemiller, and J. M. Savino. Mar 82, 38p DOE/NASA/20320-39, NASA-TM-82804
Contract AI01-76ET20320
Portions of document are illegible.
Available in microfiche only.

Three designs of a guyed cylindrical tower and its foundation for an intermediate size horizontal axis wind turbine generator are discussed. The primary difference in the three designs is the configuration of the rotor. Two configurations are two-blade rotors with teetering hubs - one with full span pitchable blades, the other with fixed pitch blades. The third configuration is a three-bladed rotor with a rigid hub and fixed pitch blades. In all configurations the diameter of the rotor is 38 meters and the axis of rotation is 30.4 meters above grade, and the power output is 200 kW and 400 kW. For each configuration the design is based upon for the most severe loading condition - either operating wind or hurricane conditions. The diameter of the tower is selected to be 1.5 meters (since it was determined that this would provide sufficient space for access ladders within the tower) with guy rods attached at 10.7 meters above grade. Completing a design requires selecting the required thicknesses of the various cylindrical segments, the number and diameter of the guy rods, the number and size of soil anchors, and the size of the central foundation. The lower natural frequencies of vibration are determined for each design to ensure that operation near resonance does not occur. Finally, a cost estimate is prepared for each design. A preliminary design and cost estimate of a cantilever tower (cylindrical and not guyed) and its foundation is also presented for each of the three configurations. The estimated costs of the guyed towers and the cantilever towers are compared with the installed costs of truss type towers and foundations of the 200 kW Mod-0A wind turbines at Block Island and Culebra.

DE82012609 PC **A04**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Midtemperature Solar Systems Test Facility Predictions for Thermal Performance Based on Test Data of Low- to Medium-Temperature Line-Focusing Solar Collectors. Sunpower Systems Solar Collectors.
T. D. Harrison. Feb 82, 54p SAND-82-0092/3
Contract AC04-76DP00789
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Thermal performance predictions based on test data are presented for the Sunpower Systems solar collector for three output temperatures at eight cities in the United States. (ERA citation 07:043059)

DE82012883 PC **A04**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Residential-Appliance Load Characteristics.
J. Kohler. Apr 82, 75p SERI/TR-11095-1
Contract AC02-77CH00178
Portions of document are illegible.

The performance of residential photovoltaic systems in combination with energy-efficient appliances is examined. The load characteristics are presented for several types of major residential applicances. Load characteristics consist of the average energy use of each appliance, the power demand while the appliance is operating, and a typical use schedule. Potential energy-conserving features are investigated for each appliance and used to identify a best available model and maximum feasible energy-efficient appliance. Load characteristics of these energy-conserving designs are then compared with the load characteristics of a standard model. The feasibility of converting appliances to dc power for use with photovoltaic systems is also discussed. (ERA citation 07:042899)

DE82012887 PC **A03**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Flow Instability During Direct Steam Generation in a Line-Focus Solar-Collector System.
R. J. Pederson, and E. K. May. Mar 82, 31p SERI/TR-632-1354
Contract AC02-77CH00178

The problem of two-phase flow instability as applied to the direct generation of steam in a parallel-channel, line-focus solar system is addressed. Five types of flow instability have been identified as being potentially harmful to the operation of the system. The basic mechanism contributing to these instabilities and the criteria used to predict their onset are discussed. These criteria are presented in the form of two generalized maps that can be used for steady as well as transient operation. The analysis shows that the system currently being considered can be made to operate in a stable manner with only minor modification. (ERA citation 07:042923)

DE82900730 MF **A01**
Goeteborg Univ. (Sweden).
Future Energy Supply of Sweden in a Historical and Global Perspective an Attempt to State the Basis and the Fundamental Judgments.
K. E. Eriksson. 1981, 95p NP-2900730
In Swedish.Portions of document are illegible.
U.S. Sales Only. Available in microfiche only.

The aim of the report is to introduce the concepts and the background which are necessary for the basis of the study of future energy supply. The perspective is generalized, and the idea is to integrate many disciplines. The basis of the study is scientific. The conversion of energy and material is said to be essential for social life. The combination of population and the environment is presented as fundamental and the ecological discussions are directed towards human beings. The development of future resources is accentuated. Finally a concept is introduced to link together human ecology and economy. (ERA citation 07:043782)

DE82900736 MF **A01**
Stockholm Univ. (Sweden). Forskningsgruppen foer Energisystestudier.
Use of Energy in Sweden 1965-1978.
G. Oestblom. Sep 80, 149p FFE-4-1980
In Swedish.Portions of document are illegible.
U.S. Sales Only. Available in microfiche only.

The report discusses the long-term changes of the use of energy in Sweden. A detailed picture of the structure of energy use is given. The utilization of electric power and fuels in various sectors of the society and lines of business is presented. The indirect flow of energy through the economy as deliveries of goods and services with energy content also is reported. The discription of methods and the resulting tables are included. (ERA citation 07:043797)

DE82901849 MF **A01**
Energy Utilization Systems, Inc., Pittsburgh, PA.
1980 Survey and Evaluation of Utility Conservation, Load Management, and Solar End-Use Projects. Volume 2. Solar End-Use Projects. Final Report.
Jan 82, 422p EPRI-EM-2193-V.2
Portions of document are illegible.
Available in microfiche only.

The results are described of the 1980 survey of electric utility-sponsored end-use solar energy conversion projects. The results of an extensive survey to determine electric utility involvement in customer-side projects related to solar technology, selected descriptions of utility projects and results, and first-level technical and economic evaluations are presented. (ERA citation 07:042748)

DE82902046 MF **A01**
Mississippi State Univ., Mississippi State. Cooperative Extension Service
Inflation Fighter's Guide to Energy Conservation. Publication 1298.
1981, 1p NP-2902046
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

Informative articles on energy conserving measures for households are presented in the brochure. The impact of inflation on households in Mississippi and how to cope with the problem are discussed. Specific facts on house designs, window treatment, insulating existing houses, buying room air conditioners, and weatherizing the home are covered in additional articles. Energy facts on the use of carpets, heat pumps, fireplaces, thermal insulation, and lighting systems are presented. Energy saved from proper operation and maintenance of automobiles and efficient use of appliances are discussed. Information on appliance energy labels, performing a home energy audit, and how to read the utility meter is given. Directions are given for making fireplace covers, storm windows, newspaper logs, and draft deflectors. A home energy checklist is included.

DE82902160 PC **A03**/MF **A01**
Stuttgart Univ. (Germany, F.R.). Inst. fuer Statik und Dynamik der Luft- und Raumfahrtkonstruktionen.
Load Cycles and Material Data for the Layout of a Wind Turbine with a Special Type of Center.
J. H. Argyris, and K. A. Braun. Jun 79, 38p ISD-260
In German.Portions of this report are illegible.
U.S. Sales Only.

For the layout of rotorblades made from different materials we need material data as well as geometry. Of special interest are the admissible stresses, which are dependent on the material, kind and number of loading cycles. In chapter 1 we determine the numbers of those loading cycles which are thought to be relevant. The decisive parameters are the number of starts and the time of operation. We discuss the dependence of these parameters on the cut-in wind velocity, the vertical wind gradient and the wind characteristics. Therefore, results from /1/ were used. Publication /19/ (which replaces /1/) appeared too late to be used here. The small differences in its results, however, would not have influenced the admissible stresses. In chapter 2 the fatigue strengths were estimated and the admissible stresses determined. The materials used are well-known in aeronautics. (ERA citation 07:043207)

DE82902170 PC **A06**/MF **A01**
Bundesministerium fuer Forschung und Technologie, Bonn-Bad Godesberg (Germany, F.R.).
Analysis of the Amount of Energy and Material Used in the Packings of Liquid Nourishment and Luxuries. Volume 3. The Summarized, Specific Energy Consumption and the Possibilities to Control It.
W. Flaschar, and G. Richter. Feb 81, 121p BMFT-FB-T-81-061
In German.
U.S. Sales Only.

The project was finished in 1980. The objective was to analytically examine the amount of energy used in production of packings in packing process. The amount of energy and material required in packings from raw material to completed packing of multiple-way and one-way bottles, containers, kegs and trays for beer and beverages was demonstrated. Conclusions: The demonstrated method can also show the amount of material required for packing any other product. (ERA citation 07:044030)

DE82902173 MF **A01**
Bundesministerium fuer Forschung und Technologie, Bonn-Bad Godesberg (Germany, F.R.).
Analysis of the Amount of Energy and Material Used in the Packings of Liquid Nourishment and Luxuries. Volume 2. The Amount of Materials in Order to Research the Material Input and Output from the Raw Materials Up to the Fillings of the Packings in All Producing Steps.
J. Vogelsang, and R. Knoth. Feb 81, 110p BMFT-FB-T-81-060
In German.
U.S. Sales Only. Available in microfiche only.

The project was finished in 1979. The objectives were to examine analytically the amount of materials used in the production of packings, the packing process, and filling of the packings in all production steps. The amount of materials required in the production of packings from raw materials to ready packings of multileway and one-way bottles, containers, kegs, and trays for beer and beverages was demonstrated. The demonstrated methods can show the amount of material and energy required for any other products. (ERA citation 07:044029)

DE82902362 MF **A01**
Essen Univ. (Gesamthochschule) (Germany, F.R.). Fachbereich Energie-, Verfahrens- und Elektrotechnik.
Reversing Plate Recuperator for Open Circuit Gas Turbines. Dimensioning - Design Limits - Application Chances.
F. Richarts. 4 Sep 79, 209p NP-2902362
In German.Thesis.
U.S. Sales Only. Available in microfiche only.

The aim of this paper is the design of recuperators which can be constructed on the base of the severing plate concept. The task includes the treatment of the following problems: derivation of dimensioning rules; study of the influences of geometry; consideration of the effects of the longitudinal heat flux; estimation of the effect of manufacture tolerances; proposals for construction; study of the dynamic behavior. For different design cases apparatures are projected that may be used in open circuit gas turbines of different sizes. In an optimization calculation it is investigated if there is an optimum of costs for the total plant, i.e. gasturbine including recuperator. (ERA citation 07:043256)

DE82902369 PC **A03**/MF **A01**
GKSS - Forschungszentrum Geesthacht G.m.b.H., Geesthacht-Tesperhude (Germany, F.R.)
Comparative Investigations on the Performance of Small Wind Energy Conversion Systems.
S. Fries, D. Borchers, and G. Petersen. 1980, 27p GKSS-80/E/54
U.S. Sales Only.

To investigate the reliability, maintenance demand and power capacity of small wind energy converters 9 different windmills in the range of 10 KW are tested by the GKSS Forschungszentrum Geesthacht GmbH over a period of two years. As a test site with favourable wind conditions the Northfrisian island of Pellworm was selected. Here the average annual windspeed exceeds 7 m/s. The measurement program comprises besides the absolute necessary data for the test program some additional meteorological parameters, which are important for the description of the climatic conditions on the site. For the data processing and to control the load resistances microprocessors are installed. (ERA citation 07:043203)

DE82902461 PC **A05**/MF **A01**
Ministerio das Minas e Energia, Brasilia (Brazil).
Brazilian Energy Model.
May 81, 91p NP-2902461
In Spanish.Portions of document are illegible.

A summary of the energy situation in Brazil is presented. Energy consumption rates, reserves of primary energy, and the basic needs and strategies for meeting energy self sufficiency are discussed. Conserving energy, increasing petroleum production, and utilizing other domestic energy products and petroleum byproducts are discussed. Specific programs are described for the development and use of alcohol fuels, wood and charcoal, coal, schist, solar and geothermal energy, power from the sea, fresh biomass, special batteries, hydrogen, vegetable oil, and electric energy from water power, nuclear, and coal. Details of the energy model for 1985 are given. Attention is also given to the energy demands and the structure of global energy from 1979 to 1985. (ERA citation 07:043788)

DE82902769 MF **A01**
Japan Geothermal Energy Association, Tokyo.
Annual Information on Development and Utilization for Geothermal Energy in Japan.
H. Iga, and K. Baba. 1980, 16p NP-2902769
U.S. Sales Only. Available in microfiche only.

Geothermal activities in Japan are reviewed as follows: present power plant status, supply of generating equipment for export, a new energy development organization and a new energy foundation, geothermal resource development, geothermal technology research, and training engineers from developing nations. (ERA citation 07:043075)

N82-27849/0 PC **A12**/MF **A01**
Delegationen foer Energiforskning, Stockholm (Sweden).
Long-Term Energy Options for Sweden. The IEA Model and Some Simulation Results.
P. A. Bergendahl, and C. Bergstroem. 1981, 261p DE82-900916, DFE-36

Major findings of the simulations made using the Swedish version of the MARKAL model are summarized. It is an attempt to determine what new energy supply, conversion and end-use technologies will be needed in Sweden during the next several decades, and to assess the energy contribution that can be expected from them. The reader is aquainted with the analytical approach to the planning and analysis of energy research and development programs used. An overview is given of the problem structure and analytical apparatus.

N82-27856/5 PC **A23**/MF **A01**
Fraunhofer-Gesellschaft zur Foerderung der Angewandten Forschung e.V., Karlsruhe (Germany, F.R.). Inst. fuer Systemtechnik und Innovationsforschung.
Possibilities for Energy Consumption Through Microelectronics.
Final Report.
G. Angerer, E. Boehm, U. Hauser, E. Jochen, and W. Mannsbart. Feb 82, 540p BMFT-FB-T-82-0022, ISSN-0340-7608
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

Application of microelectronic sensors, integrated circuits, and actuators in order to control energy consuming processes and reduce energy losses was studied. The energy saving potential of microelectronics was investigated in various sectors of secondary energy consumption, i.e., heating, electrical household equipment, road traffic, business, hot water and steam generation, and use of electrical motors. Findings are based on secondary energy consumption in the Federal Republic of Germany. Results show that potential energy savings can reduce demand for primary energy by 265 to 290 billion kilowatt hours. (8% to 9% of the total demand of the Federal Republic of Germany).

PB82-192014 CP **T02**
Department of Energy, Washington, DC.
Nonresidential Buildings Energy Consumption Survey (NRECS), 1979-80.
Data file,
Raymond Marcotte. 1980, mag tape DOE/DF-82/011
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify reecording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions. Price includes documentation.

The Nonresidential Buildings Energy Consumption Survey (NBECS) was designed to provide information related to energy consumption in nonresidential buildings, primarily those in the commercial sector. A representative sample of all nonresidential buildings in the 48 contiguous states and the District of Columbia was selected using a multistage area probability technique, supplemented by a list of large buildings. Data concerning characteristics of the building structure, activities in the building, heating and air conditioning equipment and energy sources and end uses were collected in personal interviews with building owners or managers. Fieldwork for the NBECS was initiated in October 1979 and continued through January 1980. This data tape consists of 4 files. The first file contains the raw data; this file has 6,222 records, one record for each building. The second file contains full SPSS data definitions; the third file contains COBOL file definition information; and the fourth file contains a TPL (Table Producing Language) codebook.

PB82-242504 PC **A10**/MF **A01**
Department of Energy, Washington, DC.
Nonresidential Building Energy Consumption Survey (NBECS) User's Guide.
Jun 82, 225p DOE/DF-82/011B
For system on magnetic tape, see PB82-192014. See also PB82-242512.

The User's Guide provides basic information and technical specifications necessary for using the public-use tape containing the Building Characteristics, Energy End Use & Fuel Oil Tank data from the NBECS. Included are an overview of the NBECS, technical specifications for reading the tape and descriptions of the contents of each of the files contained on the tape. The Nonresidential Buildings Energy Consumption Survey (NBECS) was designed by the Office of the Consumption Data System, Energy Information Administration, U.S. Department of Energy to provide information related to energy consumption in nonresidential buildings, primarily those in the commercial sector. A representative sample of all nonresidential buildings in the 48 contiguous states and the District of Columbia was selected using a multistage area probability technique, supplemented by a list of large buildings. Data concerning characteristics of the building structure, activities in the building, heating and air conditioning equipment and energy sources and end uses were collected in personal interviews with building owners or managers. At the end of the interview, respondents were asked to sign waivers authorizing energy suppliers to release records of the buildings' energy consumption and expenditures. This tape includes data from the building portion of the survey. The information on energy consumption and expenditures will be released at a later date.

PB82-242512 PC **A04**/MF **A01**
Department of Energy, Washington, DC.
Nonresidential Building Energy Consumption Survey (NBECS) Shopper's Guide.
Jun 82, 54p DOE/DF-82/011A
For system on magnetic tape, see PB82-192014. See also PB82-242504.

The Shopper's Guide contains an overview of the NBECS, brief descriptions of each of the files included on the tape and list of variables in the main data set. Also included is a copy of the questionnaire used in the collection of data for the NBECS. The Nonresidential Buildings Energy Consumption Survey (NBECS) was designed by the Office of the Consumption Data System, Energy Information Administration, U.S. Department of Energy to provide information related to energy consumption in nonresidential buildings, primarily those in the commercial sector. A representative sample of all nonresidential buildings in the 48 contiguous states and the District of Columbia was selected using a multistage area probability technique, supplemented by a list of large buildings. Data concerning characteristics of the building structure, activities in the building, heating and air conditioning equipment and energy sources and end uses were collected in personal interviews with building owners or managers. At the end of the interview, respondents were asked to sign waivers authorizing energy suppliers to release records of the buildings' energy consumption and expenditures. This tape includes data from the building portion of the survey. The information on energy consumption and expenditures will be released at a later date.

PB82-249517 PC **A07**/MF **A01**
Energy Systems International, McLean, VA.

Preliminary Energy Sector Assessments of Jamaica. Volume I: Executive Summary.
Jan 80, 142p ESI/EA-80-0101-1, AID-PN-AAJ-422
Contract AID-523-79-11
See also Volume 2, PB82-249525.
Also available in set of 8 reports PC E99, PB82-249509.

Because heavy dependence on costly imported fuel has greatly inhibited Jamaica's economic development, USAID/Jamaica and the Government of Jamaica (GOJ) sponsored a preliminary energy assessment to identify and develop viable alternative energy options. Specialized studies included solar energy (commercial/industrial and agricultural), biogas applications, energy conversion from waste, a coal prefeasibility study, and an electric utility rate analysis. Individual studies were published in three volumes (with volume three on renewable energy being in four parts, for a total of six volumes). This first introductory volume provides a lengthy executive summary of the entire assessment.

PB82-249525 PC **A06**/MF **A01**
Energy Systems International, McLean, VA.
Preliminary Energy Sector Assessments of Jamaica. Volume II: Economic Assessment.
Jan 80, 108p ESI/EA-80-0101-2, AID-PN-AAJ-423
Contract AID-532-79-11
See also Volume 1, PB82-249517 and Volume 3, PB82-249533.
Also available in set of 8 reports PC E99, PB82-249509.

This volume presents an economic assessment of the specialized study areas, reviewing recommendations from the specialized studies in relation to each other and to the GOJ's 5-year Development and Energy Sector Plans. After analyzing the effects of these recommendations on Jamaica's energy situation and economy, the recommendations are integrated and prioritized in a proposed Combined Energy Program (CEP) which is recommended for immediate GOJ implementation. Highest priority items include research, testing, training, and tax structures to encourage solar hot water and agricultural drying systems; installation of small- and medium-size biogas plants; and negotiating joint port usage for a possible coal-fired electricity plant.

PB82-249533 PC **A06**/MF **A01**
Energy Systems International, McLean, VA.
Preliminary Energy Sector Assessments of Jamaica. Volume III: Renewable Energy. Part I: Solar Energy - Commercial and Industrial.
Jan 80, 102p ESI/EA-80-0101-3A, AID-PN-AAJ-424
Contract AID-532-79-11
See also Volume 2, PB82-249525 and Volume 3, Part 2, PB82-249541.
Also available in set of 8 reports PC E99, PB82-249509.

This study concerns commercial and industrial solar applications, specifically solar water heating and solar air cooling. The study finds that solar domestic water heating and boiler make-up water preheating are technically feasible and, depending on the displaced energy source (electrical or various fuel types), economically justified; and that solar hot water installations could displace the equivalent of 189,842 barrels of fuel oil per year. However, solar cooling requires high performance collectors not currently manufactured in Jamaica, and feasibility studies indicate that solar cooling in the near term is not economically justified.

PB82-249541 PC **A04**/MF **A01**
Energy Systems International, McLean, VA.
Preliminary Energy Sector Assessments of Jamaica. Volume III: Renewable Energy. Part II: Solar Energy - Agricultural.
Jan 80, 73p ESI/EA-80-0101-3B, AID-PN-AAJ-425
Contract AID/532-79-11
See also Volume 3, Part 1, PB82-249533 and Volume 3, Part 3, PB82-249558.
Also available in set of 8 reports PC E99, PB82-249509.

The study is concerned with the use of solar heat for drying agricultural products (crops, timber, and fish). The study finds that Jamaica has an ideal climate for solar agricultural product drying with the following methods offering the greatest promise; sun drying using open barbeques; drying in transparent buildings (with or without attached collectors) for small operations; new drying systems using solar air heaters with forced air drying; preheating air for existing commercial fossil-fueled dryers; and fish drying via chemical dehydration with solar regeneration of the chemical. The primary needs are to develop and construct environmentally suitable solar dryers and to train engineers in solar system design and installation.

PB82-249558 PC **A05**/MF **A01**
Energy Systems International, McLean, VA.
Preliminary Energy Sector Assessments of Jamaica. Volume III: Renewable Energy. Part III: Biogas Applications.
Jan 80, 85p ESI/EA-80-0101-3C, AID-PN-AAJ-426
Contract AID-532-79-11
See also Volume 3, Part 2, PB82-249541 and Volume 3, Part 4, PB82-249566.
Also available in set of 8 reports PC E99, PB82-249509.

The study considers the feasibility of biogas generation and applications. Biogas is a high grade fuel produced by anaerobic digestion of organic matter such as farm crops or animal manure and is useful for cooking and other purposes.

PB82-249566 PC **A04**/MF **A01**
Energy Systems International, McLean, VA.
Preliminary Energy Sector Assessments of Jamaica. Volume III: Renewable Energy. Part IV: Energy Conversion from Waste.
Jan 80, 62p ESI/EA-80-0101-3D, AID-PN-AAJ-427
Contract AID-532-79-11
See also Volume 3, Part 3, PB82-249558 and Volume 4, PB82-249574.
Also available in set of 8 reports PC E99, PB82-249509.

The study considers the feasibility of energy conversion from wastes. Specifically, the study analyzes the potential for energy recovery from urban wastes in Jamaica, with the Kingston area serving as a case study, and assesses the feasibility of building a prototype demonstration unit for energy recovery from solid wastes at the University of the West Indies (UWI)-Mona Campus. Steam-generating waterwall combustion, refuse-derived fuel systems, pyrolysis, anaerobic biological conversion (biogas), and gas recovery from landfills are discussed as alternative systems for energy recovery from urban wastes.

PB82-249574 PC **A06**/MF **A01**
Energy Systems International, McLean, VA.
Preliminary Energy Sector Assessments of Jamaica. Volume IV: Coal Prefeasibility Study.
Jan 80, 118p ESI/EA-80-0101-4, AID-PN-AAJ-428
Contract AID-532-79-11
See also Volume 3, Part 4, PB82-249566 and Volume 5, PB82-249582.
Also available in set of 8 reports PC E99, PB82-249509.

The study assesses the technical, economic, and environmental feasibility of diversification from oil to coal for generating electric power for the Jamaican Public Service Company (JPS) and the bauxite/alumina industry.

PB82-249582 PC **A07**/MF **A01**
Energy Systems International, McLean, VA.
Preliminary Energy Sector Assessments of Jamaica. Volume V: Electric Utility Rate Analysis.
Jan 80, 136p ESI/EA-80-0101-5, AID-PN-AAJ-429
Contract AID-532-79-11
See also Volume 4, PB82-249582.
Also available in set of 8 reports PC E99, PB82-249509.

The study analyzes the electric utility rate structure of the Jamaica Public Service Company (JPS) in order to determine whether it promotes economically efficient use of electricity, is based on principles of equity and fairness, and provides JPS with sufficient resources to maintain acceptable service quality. Current tariffs are described, and features such as declining block tariffs (decreasing unit price with increasing volume used), expander clauses (decreasing rate if total energy use increases without increasing maximum power demand), and ratchet clauses (little or no reduction in charges if use falls below a previously set high), which may not encourage conservation or efficient system usage, are noted. Various tariff options, based on marginal cost pricing principles (tying prices to the additional cost of supplying the electricity), are presented for each rate category in the JPS system (residential, small commercial, industrial, and large commercial). Flat rate (with and without demand charges), time of use pricing, fuel adjustment, and cost of service adjustment are considered.

PB82-255191 PC **A04**/MF **A01**
Dornier-System G.m.b.H., Friedrichshafen (Germany, F.R.).
A Highly Efficient Collector for Small Solar Energy Installations,
E. Obermayr, W. Molt, D. Schneller, and K. Speidel.
Aug 82, 72p BMFT-FB-T-81-156
Trans. of mono. Hochleistungskollektor fuer Sonnenenergie-Kleinanlagen, Bonn, p1-100 Sep 81. See also N82-15538.

Project objective is the development of high efficient collectors to be used for small solar powered facilities (solar cooling processes and solar powered facilities for mechanical or electric energy production). A series of preliminary investigations and laboratory tests have been performed, which form the basis of collector designs. Due to the results of the performed tests it was decided to develop vacuum flat plate collectors instead of concentrating on collectors as an alternative version in this special form of ap ications. The function of this collector is different, as the working medium is evaporated within the collector itself; the collector is an evaporator. Different designs have been planned and investigated. Prototypes of direct evaporation collectors have been constructed and tested. The test results of the prototype correspond to the calculated values. In the temperature range forseen for this application (130 - 150C), the collector efficiency is about 40 - 50%.

PB82-255241 PC **A07**/MF **A01**
WAPORA, Inc., Chicago, IL.
Preliminary Investigation of Small-Scale Hydropower Potential at Five Sites in Illinois - Phase II Report.
Final rept.,
Greg Lindsey, and Dan Sweeney. Jan 81, 126p IINR-81/05

The report constitutes the results of a three-part study for the Illinois Institute of Natural Resources. An inventory of the existing dam sites in Illinois was prepared during Phase I of the study. Therefore, Phase II of this study reports on preliminary investigations of five potential sites. These sites were screened to select those with the greatest relative potential for economic development. This report also is a guide to potential developers of small-scale hydropower sites in Illinois.

PB82-259276 PC **A13**/MF **A01**
DSS Engineers, Inc., Fort Lauderdale, FL.
Waste Heat Recovery Potential in Selected Industries,
S. R. Latour, and J. G. Menningmann. Feb 81, 278p
EPA-600/7-82/030
Contract EPA-68-01-4454
Portions of this document are not fully legible.

The research project was initiated with the overall objective of identifying the points, qualities, and quantities, of waste heat discharged to the environment by energy intensive industries and emerging technologies for energy development. These data may then be utilized to evaluate various heat management alternatives and to further define and identify potential beneficial uses of these discharges. The first task performed during the course of the study consisted of identifying industries and emerging technologies which offered the greatest potential for discharging substantial quantities of waste heat to the environment. For each of these industries, a study was conducted to document the points, qualities, and quantities of all waste heat discharges to the environment. The report also includes a discussion of the various waste heat recovery technologies currently available for the recovery of waste heat energy as well as a brief discussion of the various environmental impacts associated with the discharge of waste heat to the environment.

10B. Power Sources

AD-A117 736/9 PC **A06**/MF **A01**
Raytheon Co., Bedford, MA. Missile Systems Div.
Power Conditioning Subsystem Design.
Interim rept. 17 Sep 79-30 Nov 81,
John J. Moriarty, Alvin M. Herling, John J. Kelleher, and Donald W. Shute. Jan 82, 112p BR-13058, AFWAL-TR-82-2005
Contract F33615-79-C-2079

This interim report describes the results of the first two phases of a 3-phase program to provide designs of lightweight, low volume power conditioning subsystems in the range of 500 kilowatts (kW) to 30 megawatts (MW) as part of the Air Force exploratory development program in high power airborne electrical power supply technology. These designs are based on presently available component technology such as solid-state switching devices, newly developed thyratons and high energy density capacitors. Although these subsystems are to be operated in a burst mode, active cooling concepts have been utilized wherever they would result in an advantage in weight or volume.

DE82006213 MF **A01**
Avco-Everett Research Lab., Inc., Everett, MA.
MHD Generator Component Development. Quarterly Report, October 1979-December 1979.
May 80, 84p DOE/ET/15614-T2
Contract AC01-80ET15614
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

Progress is reported on the following tasks: (1) perform experimental investigations related to MHD channel design and performance by testing existing channel hardware and by fabricating and testing new channel hardware; perform complementary analytical investigations; (2) perform experimental investigations related to MHD channel performance and lifetime, with the principal aim of systematically obtaining data on the prototype electrodes for the coal-fired, subsonic, long-duration CDIF Generator 1B3; (3) perform testing on channel loading and control utilizing the supersonic Reference channel No. 4 and other appropriate channels and/or test modules, at magnetic fields to 4 Tesla; and (4) provide for facility operation and maintenance of the Mk VI and Mk VII test bays. (ERA citation 07:043908)

DE82007966 MF **A01**
Engelhard Minerals and Chemicals Corp., Edison, NJ. Engelhard Industries Div.
Catalyst and Process Development for Hydrogen Preparation from Future Fuel-Cell Feedstocks. Final Report, October 1, 1978-June 30, 1981.
H. S. Hwang, I. R. Feins, and R. M. Yarrington. Sep 81, 184p DOE/ET/15383-38
Contract AC02-78ET15383
Portions of document are illegible.
Available in microfiche only.

The objective of this contract was to develop and demonstrate processes for the production of gaseous fuel cell feeds from high sulfur distillate fuels. The processes considered and studied in this program were high temperature steam reforming with hydrogen recycle, catalytic partial oxidation, and autothermal reforming. Even with hydrogen recycle, high temerature steam reforming of No. 2 oil proved to be dfficult due to carbon formation in the preheat section. Several steam reforming catalysts were evaluated during this phase of the program. (ERA citation 07:042680)

DE82008092 PC **A05**/MF **A01**
Argonne National Lab., IL.
OTEC Biofouling, Corrosion, and Materials Program. Progress Report, March 1978-March 1981.
J. E. Draley. Sep 81, 83p ANL/OTEC-BCM-024
Contract W-31-109-ENG-38
Portions of this report are illegible.
Microfiche only after original copies are exhausted.

Argonne National Laboratory has been responsible for the technical management of the OTEC Biofouling, Corrosion, and Materials Program since March 1978. By March of 1981, sensitive field-usable heat-transfer monitors had been developed, extensive open ocean testing had been done, a considerable understanding of the microbiofouling problem had been developed, and commercial methods of removal had been shown to be effective. As a material of construction for heat exchangers, titanium showed excellent corrosion resistance. New grades of stainless steel also showed excellent corrosion resistance, while the most common grades suffered from pitting and/or crevice corrosion. The best aluminum alloys and Alclads showed no pitting and moderate declining corrosion rates under optimum conditions in warm seawater, but were subject to accelerated attack from stagnant water, crevices, abrasive treatment, and ammoniated water; in cold seawater, limited data showed very good behavior. Copper-nickel alloys were similar to aluminum alloys in corrosion rate and were subject to accelerated attack from the same factors; ammonia had a particularly severe effect on these alloys. (ERA citation 07:049786)

DE82008383 MF **A01**
Stearns-Roger Engineering Co., Denver, CO.
10 MWe Solar Pilot Plant, Daggett, California. Flushing and Steam Blows Preoperational Test Procedure 980. Revision: 0.
D. L. Williams. 1980, 94p DOE/SF/10499-T65
Contract AC03-79SF10499
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

Prescribed steps are given for flushing and steam blowing the condenser hotwell, deaerator, inline demineralizers, thermal storage subsystem flash tank, and steam lines of the Barstow Solar Pilot Plant. Included are acceptance criteria, precautions, a list of test equipment, initial conditions, procedures and data collection, and system restoration. (ERA citation 07:042909)

DE82008480 PC **A02**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Development Program Leading to an Optimized Oscillating-Water-Column Wave-Energy Converter Featuring a Bi-Directional Turbine.
T. R. Penney, J. B. Miles, and M. E. McCormick. Feb 82, 12p SERI/TP-251-1462
Contract AC02-77CH00178
Portions of this report are illegible.
Microfiche only after original copies are exhausted.

Various aspects in the design, construction, testing, and modeling of an oscillating water column wave energy extraction system featuring a bi-directional pneumatic turbine are presented. The system is sized to provide 125-kW/sub e/ power output when experiencing 3-m waves. A novel design of a pneumatic turbine has been constructed and is awaiting the commencement of a steady-state test program. Modeling studies are described for the different components of the system as well as for the system as a whole. The objective of these studies is to optimize the energy production of the system given the constraints of the wave environment and the performance description of the turbine/generator equipment. Optimizing the design of the chamber forming the oscillating water column (including its opening to the ocean) and making improvements in turbine performance as suggested by the pending turbine tests will enhance system output. (ERA citation 07:050006)

DE82008514 MF **A01**
McDonnell Douglas Astronautics Co., Huntington Beach, CA.
Plant Maintenance/Training Manual, (RADL Item 2-37): Section 6. Control and Data Systems. Book 2 of 2. 10-MWe Solar-Thermal Central-Receiver Pilot Plant. Solar-Facilities Design Integration.
Jul 81, 525p SAN-0499-82-Sec.6-Bk.2, MDC-G-9705-Sect.6-Bk.2
Contract AC03-79SF10499
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

The control and data systems include red-line units, data acquisition system, data acquisition remote multiplexer systems, operational control system, beam characterization system, short haul mode, solid state relays, and thermocouple reference junctions. These parts are all listed, and the red-line units, solid state relays, and thermocouple reference junctions are individually described. In addition, the receiver red-line unit and thermal storage red-line unit are exhaustively treated, with specifications, diagrams, and operating instructions. (ERA citation 07:042927)

DE82009395 PC **A06**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Assessment of the Need for Dry Cooling: 1981 Update.
J. C. Sonnichsen. Jan 82, 117p HEDL-TME-81-47
Contract AC06-76FF02170

An assessment of the need for dry cooling of steam-electric power plants over the time period 2000 to 2020 is documented. In the assessment three scenarios for future growth in electrical energy were examined. Characteristics of fresh water supply and consumptive use of water in each of the 99 aggregated subareas within the contiguous United States were reviewed; based on this review the need for dry cooling in each pertinent subarea was delineated.

DE82009557 PC **A05**/MF **A01**
United Technologies Corp., South Windsor, CT. Power Systems Div.
Development of Molten-Carbonate Fuel-Cell Power-Plant Technology. Quarterly Technical Progress Report, April 1, 1981-June 30, 1981.
M. L. Abrams, R. D. Breault, and C. L. Bushnell. Jul 81, 86p DOE/ET/15440-7, FCR-3507
Contract AC02-79ET15440
Portions of this report are illegible.
Microfiche only after original copies are exhausted.

The overall objective of this 29-month program is to develop and verify the design of a prototype molten carbonate fuel cell stack which meets the requirements of a 1990's-competitive coal-fired electrical utility central station or industrial cogeneration power plants. During this quarter, activity continued in all four task areas: Task 1 - system studies to define the reference power plant design; Task 2 - cell and stack design, development and verification; Task 3 - preparation for fabrication and testing of the full-scale prototype stack; and Task 4 - development of the capability to operate stacks on coal-derived gas.

DE82009959 PC **A03**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Evaluation and Verification of Epitaxial Process Sequence for Silicon Solar-Cell Production. Final Program Summary Report.
D. Redfield. Nov 81, 27p DOE/JPL/955825-81/3
Contract NAS-7-100-955825

Progress, present status, and data are presented for work in the areas of silicon substrate materials epitaxial substrates and epitaxial growth and of solar cells production process sequence determination especially, and also in the areas of process specification, minimodule design, process and design verification, and cost evaluation and projections.

DE82010915 PC **A05**/MF **A01**
Curtiss-Wright Corp., Wood-Ridge, NJ. Power Systems Div.
Engineer, Design, Construct, Test, and Evaluate a Pressurized Fluidized-Bed Pilot Plant Using High-Sulfur Coal for Production of Electric Power. Phase III: Construction. Annual Report, March 1, 1980-February 28, 1981.
1981, 84p CW-WR-76-015.60A, FE-1726-60A
Contract AC21-76ET10417
Portions of document are illegible.
Microfiche only after original copies are exhausted.

Progress in the construction of the 13 MW pressurized fluidized bed (PFB) pilot plant at Wood-Ridge, NJ is reported. Excavation at the site began in November 1980. Steel fabrication is continuing with steel erection scheduled for May 1981. Procurement of mechanical equipment, especially materials handling equipment is underway. Contracts have been let for the gas turbine components and for the manufacture of the PFB process components. (ERA citation 07:050107)

DE82010916 PC **A04**/MF **A01**
Mobil Tyco Solar Energy Corp., Waltham, MA.
Large-Area Silicon Sheets by EFG. Annual Progress Report, October 1, 1980-September 30, 1981.
29 Jan 82, 71p DOE/JPL/954355-81-19
Contract NAS-7-100-954355
Portions of this report are illegible.
Microfiche only after original copies are exhausted.

Progress has been made in the past year in improving ribbon flatness and reducing stress, and in raising cell performance for 10 cm wide ribbon grown in single cartridge EFG furnaces. Optimization of growth conditions has resulted in improved ribbon thickness uniformity at a thickness of 200 mu m, grown at 4 cm/minute, and

growth at this target speed is now routinely achieved over periods of the order of one hour or more. With the improved ribbon flatness, fabrication of large area (50 cm exp 2) cells now possible, and 10-11% efficiencies have been demonstrated on ribbon grown at 3.5 to 4 cm/minute. Factors limiting performance of the existing multiple ribbon furnace have been identified, and growth system improvements implemented to help raise throughput rates and the time percentage of simultaneous three-ribbon growth. However, this work has made it evident that major redesign of this furnace would be needed to overcome shortfalls in its ability to achieve the Technical Features Demonstration goals of 1980. This course of action did not appear to be warranted because of the age of the furnace. It was decided instead to start construction of a new multiple ribbon furnace and to incorporate the desired improvements into its design. The construction of this furnace is now completed, and it is expected to be put into operation in the last quarter of 1981. As of October 1, 1981, the entire multiple ribbon furnace program was incorporated into the Mobil Tyco in-house program. The final status for this portion of the program is reported. (ERA citation 07:046194)

DE82010997 PC **A07**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Preparation of Silicon Substrates for Gallium-Arsenide Solar Cells by Electron-Beam-Pulse Processing. Annual Technical Report, March 15, 1980-March 15, 1981.
S. P. Tobin. May 81, 140p DOE/SERI-90021/4
Contract AC02-77CH00178
Portions of document are illegible.
Microfiche only after original copies are exhausted.

In the past year a process has been developed for creating high-quality epitaxial layers of germanium on silicon substrates using rapid heating and cooling with a pulsed electron beam. This single-crystal germanium coating is the key to the production of high efficiency GaAs solar cells on low-cost silicon substrates in an economical manner. Thin (less than or equal to 1 mu m) layers of Ge have been deposited on Si wafers by chemical vapor deposition (CVD) in single-crystal form or by vacuum evaporation in amorphous or polycrystalline form. The CVD films have given the best results, with good crystallinity and electrical properties as deposited. A persistent problem with surface roughness in the as-deposited films has been overcome by pulsed electron beam melting of the near-surface region in time periods on the order of a microsecond. The brief molten period smooths the surface features without compromising the crystallinity, electrical properties, or interfacial abruptness of the Ge film. These layers are of a quality suitable for further evaluation by GaAs growth and cell processing in the next phase of the program. Pulsed electron beam processing also serves a vital function for the evaporated Ge films, which are melted by the beam and recrystallized on the Si substrates, epitaxial single crystal Ge layers result from amorphous or polycrystalline starting films. To date results have not been as satisfactory as for CVD films; contamination from several sources has been identified as a problem. Many of these sources have been eliminated, so that a decision on the intrinsic limitations of the evaporated film approach should be made in the near future.

DE82011046 PC **A05**/MF **A01**
General Electric Co., Philadelphia, PA. Advanced Energy Programs Dept.
Bypass Diode Integration. Final Report.
11 Dec 81, 99p DOE/JPL/955894-4
Contract NAS-7-100-955894

The results of a bypass diode integration study which was conducted as part of the Integrated Residential Photovoltaic Array Development effort are summarized. The study involved research into protective bypass diodes and mounting configurations which are applicable for use with photovoltaic modules having power dissipation requirements in the 5 to 50 watt range. Using PN silicon and Schottky diode characterization data on packaged diodes and diode chips, typical diodes were selected as representative for each range of current carrying capacity, an appropriate heat dissipating mounting concept along with its environmental enclosure was defined, and a thermal analysis relating junction temperature as a function of power dissipation was performed. In addition, the heat dissipating mounting device dimensions were varied to determine the effect on junction temperature. The results of the analysis are presented as a set of curves indicating junction temperature as a function of power dissipation for each diode package. (ERA citation 07:046200)

DE82011264 PC **A02**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Measured Performance of Direct-Contact Jet Condensers.
D. Bharathan, D. A. Olson, H. J. Green, and D. H. Johnson. Jan 82, 9p SERI/TP-252-1437, CONF-811205-3
Contract AC02-77CH00178
AIWA terrestrial energy systems conference, Colorado Springs, CO, USA, 1 Dec 1981, Portions of this report are illegible.
Microfiche only after original copies are exhausted.

Measured heat transfer rates and condensation efficiencies of water jets condensing steam at pressures in the range of 0.9 to 4.0 kPa (6 to 29 exp 0 C, saturation temperatures) are reported. Experimental variables include jet Reynolds number, water inlet temperature, steam-to-water ratio, and the concentration of noncondensible gases. Measured Stanton number appears to be a strong function of the concentration of the noncondensibles and a weak function of other variables. At minimal level of noncondensibles, the Stanton number takes on a value of 0.0017. A description of the apparatus and initial set of results are presented. (ERA citation 07:046328)

DE82011434 MF **A01**
Solar Energy Research Inst., Golden, CO.
Controlled Cadmium Telluride Thin Films for Solar-Cell Applications. Final Technical Report, June 1, 1980-May 31, 1981.
M. B. Das, and S. V. Krishnaswamy. Jun 81, 55p SERI/TR-9131-1-T4
Contract AC02-77CH00178
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The objectives of this contract were to carry out a systematic study on the preparation and characterization of rf-sputtered CdTe thin films in order to establish reproducibility of the films with good electrical characteristics and to demonstrate the feasibility of fabricating various types of junctions and ohmic contacts with reproducible characteristics and finally to optimize the most promising solar cell structure in order to achieve an efficiency of 6% or higher. Efforts have been directed to the control of various sputtering parameters in order to obtain good quality films. The structure, crystallographic, compositional and electrical properties of cadmium telluride films sputtered over a wide range of conditions have been evaluated. A series of doping experiments have been carried out using primarily Cd, Te, In, as the n-type dopants and Cu as the p-type dopant. Of these dopants, indium doping provided films with which S.B. junctions can be obtained for further electrical characterization. Use of cadmium overpressure during CdTe:In sputtering has improved the film characteristics. Ion Beam Sputtering was attempted as an alternative technique for film preparation. For lack of time and due to a number of mechanical failures, no significant results could be obtained. (ERA citation 07:042840)

DE82011697 MF **A01**
Federal Energy Regulatory Commission, Washington, DC. Office of Electric Power Regulation.
A.J. Wiley Project, FERC No. 2845, Idaho Draft Environmental Impact Statement.
Feb 82, 284p FERC/EIS-0031/D
Portions of this report are illegible.
Available in microfiche only.

A proposal has been made by the Idaho Power Company (Applicant) of Boise, Idaho to construct a hydroelectric project with an installed generating capacity of 85.8 MW on the Snake River in Twin Falls and Gooding Counties, Idaho. The proposed project would consist of: Wiley Dam, a 680-foot long, 100-foot high earth filled embankment with an impervious core and rock surface containing a 175-foot wide concrete ogee spillway located on the north abutment controlled by three 45-foot wide and 35-foot high tainter gates; a reservoir, which would extend to the tailwaters of the existing Lower Salmon and Lower Malad Power Plants of FERC Projects Nos. 2061 and 2726, respectively, with a gross storage capacity of 24,000 acre-feet msl; and a surface area of 625 acres at elevation 2735 feet msl; a concrete intake structure within the dam, south of the spillway, forming a monolithic structure with; a reinforced concrete powerhouse located below the dam; a 13.8/138-kV 3-phase transformer and switching structures adjacent to the powerhouse; and a 3-mile long transmission line connecting the proposed powerhouse to the Applicant's existing transmission line, south of the project site. Applicant states that the Bliss Bridge and adjacent portions of Shoestring Road would be inundated by the proposed project. Applicant proposes to build a new bridge at a point 1500 feet downstream of the proposed dam and reroute and reconstruct the inundated portions of the road. (ERA citation 07:049523)

DE82012059 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Intermediate Photovoltaic System Application Experiment Operational Performance Report. Volume 8 for Newman Power Station, El Paso, TX.
Feb 82, 25p SAND-81-7086/8
Contract AC04-76DP00789
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For the month of January, 1982, performance data are given for a photovoltaic power supply used by a Texas electric utility. Data presented include: daily and monthly electrical energy produced; daily and monthly solar energy incident on the array; daily and monthly array efficiency; plots of energy produced as a function of power level, voltage, cell temperature, and hour of day; electrical energy supplied by the photovoltaic system to the load and the corresponding dollar value; photovoltaic system efficiency; capacity factor; daily photovoltaic power supplied to the load; daily system availability; hourly and monthly insolation; hourly and monthly ambient temperature; hourly and monthly average wind speed; wind direction distribution; number of freeze/thaw cycles; heating and cooling degree days; hourly cell temperature; daily data acquisition mode and recording interval plot. Also included are brief summaries of problems, operations and maintenance events.

DE82012065 PC **A05**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Investigation of a Family of Power Conditioners Integrated into a Utility Grid. Phase II Report, January 1, 1981 to December 31, 1981.
P. Wood, and R. P. Putkovich. Jan 82, 91p SAND-81-7043
Contracts AC04-76DP00789, AC02-79ET29359
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Conceptual design of a new family of power conditioners for intermediate size solar photovoltaic applications is covered. The identification of ac and dc interface requirements, review and evaluation of existing power conditioning equipment, selection of a baseline design, and investigation of alternative power conditioning concepts are discussed. Performance specifications, efficiency projections, and cost and reliability estimates for the conceptual design are given.

DE82012328 PC **A05**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
500-KW DCHX Pilot-Plant Evaluation Testing.
A. Hlinak, T. Lee, J. Loback, K. Nichols, and R. Olander. Oct 81, 96p LBL-13339
Contract AC03-76SF00098

Field tests with the 500 kW Direct Contact Pilot Plant were conducted utilizing brine from well Mesa 6-2. The tests were intended to develop comprehensive performance data, design criteria, and economic factors for the direct contact power plant. The tests were conducted in two phases. The first test phase was to determine specific component performance of the DCHX, turbine, condensers and pumps, and to evaluate chemical mass balances of non-condensible gases in the IC sub 4 loop and IC sub 4 in the brine stream. The second test phase was to provide a longer term run at nearly fixed operating conditions in order to evaluate plant performance and identify operating cost data for the pilot plant. During these tests the total accumulated run time on major system components exceeded 1180 hours with 777 hours on the turbine prime mover. Direct contact heat exchanger performance exceeded the design prediction.

DE82012552 MF **A01**
Federal Energy Regulatory Commission, Washington, DC.
Cowlitz Falls Project No. 2833 - Washington.
Apr 82, 224p FERC/EIS-0032/D
Portions of document are illegible.

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The Public Utility District No. 1 of Lewis County (Applicant), of Chehalis, Washington, proposes to construct a hydroelectric project with an installed capacity of 70 MW on the Cowlitz River in the vicinity of Morton and Randle, Washington. The project would inundate 12.3 miles of the Cowlitz River and 1.7 miles of the Cispus River, and would consist of: (1) a concrete-gravity dam at River Mile (RM) 88.6, extending 140 feet above the streambed, with a 15-foot-wide, 800-foot-long crest, and containing an ogee spillway overflow section with four radial gates; (2) a power intake structure integral with a non-overflow section of the dam; (3) a reservoir covering 870 acres, with a total volume of 13,150 acre-feet; (4) an indoor powerhouse integrated with the dam and intake; (5) a switchyard located about 500 feet downstream from the powerhouse; (6) a tailrace and modified channel, extending approximately 1 mile downstream from the powerhouse; (7) a 115-kV transmission line, extending approximately 5.2 miles to a new substation at Glenoma; and (8) appurtenant facilities. (ERA citation 07:042719)

DE82012614 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Nuclear Power from Fission Reactors: An Introduction.
Mar 82, 23p DOE/NE-0029

The purpose of this booklet is to provide a basic understanding of nuclear fission energy and different fission reactor concepts. (ERA citation 07:043308)

DE82012863 PC **A03**/MF **A01**
Westinghouse Electric Corp., Pittsburgh, PA. Advanced Energy Systems Div.
Cell-Module and Fuel-Conditioner Development. 9TH Quarterly Report, October-December 1981.
J. M. Feret. Jan 82, 50p DOE/NASA/0161-1, NASA-CR-165620
Contract AI01-80ET17088
Portions of document are illegible.

Progress on the second phase of a six phase program to develop commercially viable on-site in.egrated energy systems (OS/IES) is reported using phosphoric acid fuel cell (PAFC) modules to convert fuel to electricity is reported. Phase II is a planned twenty-nine month effort to develop appropriate fuel cell module and fuel conditioner conceptual designs. The fuel cell module development effort involved comprises four coordinated tasks: (1) design of large cell stacks, (2) stack fabrication, (3) stack testing, and (4) management reporting and documentation. The work accomplished during this reporting period is described at the subtask level. (ERA citation 07:043914)

DE82013338 PC **A04**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Investigation of Photovoltaic Mechanisms in Polycrystalline Thin-Film Solar Cells. Interim Technical Report, November 1, 1980-July 31, 1981.
T. A. Temofonte, J. R. Szedon, and T. W. O'Keeffe.
5 Mar 82, 64p SERI/PR-9233-1-T2
Contract AC02-77CH00178
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Effort is reported on measurement technique development to assess the utility of Deep-Level Transient Spectroscopy (DLTS) methods in characterizing polycrystalline silicon that was deliberately doped with Ti during growth. Difficulties encountered with lateral DLTS measurements are discussed. In this approach, modulation of the grain boundary, double-depletion region produces the entire DLTS signal. Major effort has been applied in grain boundary characterization and control. The most significant accomplishments to date have involved laser scanning of slices of Wacker SILSO polysilicon having nearly identical grain structure. By using various kinds of treatments and by comparing treated and untreated substrates having nearly identical grain structure, control of grain boundary photocurrent suppression (delta I/sub ph/) over the range 1% less than or equal to delta I/sub ph/ less than or equal to 40% was demonstrated. (ERA citation 07:042836)

DE82013339 PC **A03**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Development of Copper Sulfide/Cadmium Sulfide Thin-Film Solar Cells.
J. R. Szedon, W. J. Biter, and H. C. Dickey. 8 Mar 82, 31p SERI/PR-8143-1-T7
Contract AC02-77CH00178

The most important accomplishments during this period were to demonstrate and to elucidate further the complex effects that occur during the aging of Cu sub 2 S/CdS thin-film solar cells in flowing wet oxygen. There are two distinct effects. At constant illumination, the short-circuit current of cells aged at room temperature consistently decreases with time. The second effect, related to diode opposing current, is more involved and may result from several competing mechanisms. Over the short term (approx. 4 to 5 hours), the magnitude of diode opposing current decreases. After approx. 20 hours of aging, opposing current generally returns to the level achieved after hydrogen annealing which immediately preceded the aging sequence. Optical measurements of the spectral transmission of the Cu sub 2 S layers in a cell content have been made using a silicon detector epoxied to the back of a CdS cell after the copper foil substrate was removed. There is no significant change in Cu sub 2 S transmission behavior for wavelengths ranging from 525 to 1000 nm during wet-oxygen aging for periods of 2 to 36 hours. This suggests that the decrease in J/sub SC/ at constant illumination, for the aging experiments in a flowing wet-oxygen ambient, arises because of changes in minority-carrier transport properties of the Cu sub 2 S. Before developing a method for using an epoxied silicon detector to measure optical behavior of the Cu sub 2 S layer, we explored the possibility of using a junction-containing wafer of silicon as a substrate for deposited CdS films. Some monolithic structures were successfully fabricated. Comparisons were made of CdS grain structure details in the junction detector area and in an adjacent metallized area. (ERA citation 07:046245)

DE82750007 PC **A07**/MF **A01**
Bundesministerium fuer Forschung und Technologie, Bonn-Bad Godesberg (Germany, F.R.).
Development of Monocrystaline CdTe Solar Cells for Terrestrial Application. Phase 2.
H. Jaeger. Aug 81, 126p BMFT-FB-T-81-150
In German.Portions of document are illegible.
U.S. Sales Only.

Development work on CdTe hetero p-n-solar cells reproduced and even increased the published characteristic maximum values. Based on the 1.5 eV bandgap of CdTe (advantageous for solar cells) and on its simple crystal growth technology, we developed p-CdTe/n-CdS and p-CdTe/n-ITO solar cells. The inverse structure (n-CdTe/p-ZnTe) furnished only poor results. Using crystalline CdTe, the technological basis was to be elaborated in view of later thin film solar cells. CdS layers were evaporated, InSn oxide (ITO) layers were sputter-deposited. Maximum values obtained with a CdTe/CdS solar cell without AR-coating were: Isub(s)sub(c) = 17 mA/cm exp 2 , Usub(o)sub(c) = 0,71 V, FF = 0,63, eta = 7,4%. With an AR-coating and a 90% transparent collector grid efficiency values of more than 9% are expected. CdTe/ITO cells yielded up to 19 mA/cm exp 2 of Isub(s)sub(c). It was not possible to optimise the barrier of this system before the end of the contract; efficiencies of more than 10% should be possible, however, with this system. A transfer of the total technology to CdTe thin films would have to find viable solutions for establishing ohmic contacts. (ERA citation 07:046180)

DE82901851 MF **A01**
United Technologies Corp., East Hartford, CT.
High-Reliability Gas-Turbine Combined-Cycle Development Program: Phase II, Volume 3. Final Report.
K. G. Hecht, R. A. Sanderson, and M. J. Smith. Jan 82, 275p EPRI-AP-222€-V.3
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This three-volume report presents the results of Phase II of the multiphase EPRI-sponsored High-Reliability Gas Turbine Combined-Cycle Development Program whose goal is to achieve a highly reliable gas turbine combined-cycle power plant, available by the mid-1980s, which would be an economically attractive baseload generation alternative for the electric utility industry. The Phase II program objective was to prepare the preliminary design of this power plant. The power plant was addressed in three areas: (1) the gas turbine, (2) the gas turbine ancillaries, and (3) the balance of plant including the steam turbine generator. To achieve the program goals, a gas turbine was incorporated which combined proven reliability characteristics with improved performance features. This gas turbine, designated the V84.3, is the result of a cooperative effort between Kraftwerk Union AG and United Technologies Corporation. Gas turbines of similar design operating in Europe under baseload conditions have demonstrated mean time between failures in excess of 40,000. The reliability characteristics of the gas turbine ancillaries and balance-of-plant equipment were improved through system simplification and component redundancy and by selection of component with inherent high reliability. A digital control system was included with logic, communications, sensor redundancy, and manual backup. An independent condition monitoring and diagnostic system was also included. Program results provide the preliminary design of a gas turbine combined-cycle baseload power plant. This power plant has a predicted mean time between failure of nearly twice the 3000-h EPRI goal. The cost of added reliability features is offset by improved performance, which results in a comparable specific cost and an 8% lower cost of electricty compared to present market offerings. (ERA citation 07:043239)

DE82902576 PC **A11**/MF **A01**
Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Projektleitung Energieforschung.
Implementing Agreement for CO-Operation in the Development of Large-Scale Wind-Energy-Conversion Systems. Fifth Meeting of Experts, Environmental and Safety Aspects of the Present Large Scale WECS, Munich, Germany, September 25-26, 1980.
Feb 81, 226p Juel-Spez-100
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Thirteen papers are included. A separate abstract was prepared for each one. (ERA citation 07:043210)

DE82903115 PC **A04**/MF **A01**
JAYCOR, Woburn, MA.
Test Plan for AFBC Control System Development at TVA'S 20-MW(E) Pilot Plant. Final Report.
D. A. Berkowitz, V. H. Sumaria, and K. C. Kalnitsky.
Mar 82, 65p EPRI-CS-2308
Portions of document are illegible.

The tests required to evaluate dynamic response characteristics of the 20 MWe AFBC Pilot Plant are described. These tests will provide information needed for control system design and determination of load-following capabilities. In discussing the scope and methodology of the tests, the relationship of dynamic modeling to the test program and the use of test results in an analytical approach to control design are also considered. The various categories of transient tests that are required for complete characterization of the full range of pilot plant dynamic response are described, including test procedures and associated instrumentation and data acquisition requirements. The transient tests are coordinated with the proposed steady state test plan as part of the overall pilot plant testing program. (ERA citation 07:043246)

DE82903283 PC **A08**/MF **A01**
Massachusetts Inst. of Tech., Cambridge.
Evaluation of Models for Predicting Evaporative Water Loss in Cooling Impoundments.
K. R. Helfrich, E. E. Adams, A. L. Godbey, and D. R. F. Harleman. Mar 82, 167p EPRI-CS-2325

Evaporation plays an important role in determining station performance (condenser intake temperature) and water consumption for electric power plants which employ cooling impoundments. This report examines evaporation from both theoretical and empirical perspectives. The performance of several commonly employed evaporation equations is compared against two comprehensive data sets using a dynamic cooling pond model. Linear calibrations are suggested based on the first set and are checked using the second. The effect of averaging meteorological input data is explored and an extension of the Harbeck diagram is presented to account for nonlinearities in the estimation of forced evaporation. (ERA citation 07:043249)

N82-27835/9 PC **A06**/MF **A01**
IIT Research Inst., Chicago, IL.
Doe/NASA SIMS Prototype Solar System, No. 4. Part 1: Market Analysis. Part 2: Modular Manufacturing Cost Estimate.
Dec 79, 105p
Contracts NASW-2837, NAS8-32229

Original Document Contains Color Photographs.

The findings of the IIT Research Institute (IITRI) market study of the SIMS Prototype System 4, a hot water (DHW) system are documented. The feasibility of prepackaging currently available solar heating components into modular subsystems for site assembly is addressed. A documented design and installation procedure and a performance test report were prepared. The potential markets and applications for this particular system in the nonfederal market are profiled by assessing the needs and requirements of potential users and specifiers, by characterizing the nature of the market and the competitive environment, by identifying the barriers to commercial acceptance, and by estimating the size of the potential market.

N82-27836/7 PC **A04**/MF **A01**
General Electric Co., Philadelphia, PA. Energy Systems and Technology Div.
Integrated Residential Photovoltaic Array Development.
Quarterly Report.
N. F. Shepard, Jr.. 17 Feb 81, 65p NASA-CR-169112, JPL-9950-508
Contract JPL-955894-1
Sponsored in Part by Doe Prepared for JPL.

An optimum integrated residential photovoltaic array/module is addressed. Nineteen existing or proposed systems intended for residential applications are described. Each of these systems is rated against a comprehensive set of evaluation criteria in an effort to formulate three module design concepts for further study and analysis. This evaluation led to a number of observations which are enumerated and should be considered in future module and array designs. Three module concepts are presented as baseline design approaches to be further analyzed and optimized. These options include: (1) a rectangular, direct mounted, shingle type module; (2) an integrally mounted module with nonconductive exposed elements; and (3) an aluminum framed, stand off module. Preliminary design drawings are presented for each of these module configurations.

N82-27837/5 PC **E08**/MF **A01**
Gilbert/Commonwealth, Reading, PA.
Magnetohydrodynamics (Mhd) Engineering Test Facility (Etf) 200 Mwe Power Plant. Conceptual Design Engineering Report (CDER). Volume 2: Engineering. Volume 3: Costs and Schedules.
Final Report.
Sep 81, 163p NASA-CR-165452-V-2, NASA-CR-165452-V-3
Contracts DEN3-224, DE-AI01-77ET-10769
Volume 3 Is Included as MF.

Engineering design details for the principal systems, system operating modes, site facilities, and structures of an engineering test facility (ETF) of a 200 MWE power plant are presented. The ETF resembles a coal-fired steam power plant in many ways. It is analogous to a conventional plant which has had the coal combustor replaced with the MHD power train. Most of the ETF components are conventional. They can, however, be sized or configured differently or perform additional functions from those in a conventional coal power plant. The boiler not only generates steam, but also performs the functions of heating the MHD oxidant, recovering seed, and controlling emissions.

N82-27838/3 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Comparative Analysis of the Conceptual Design Studies of Potential Early Commercial Mhd Power Plants (CSPEC).
R. J. Sovie, J. M. Winter, A. J. Juhasz, and R. D. Berg. 1982, 27p NASA-TM-82897, DOE/NASA/10769-26
Contract DE-AI01-77ET-10769
Presented at the 20TH Symp. On the Eng. Aspects of Magnetohydrodyn., Irvine, Calif., 14-16 Jun. 1982.

A conceptual design study of the MHD/steam plant that incorporates the use of oxygen enriched air preheated in a metallic heat exchanger as the combustor oxidant showed that this plant is the most attractive for early commercial applications. The variation of performance and cost was investigated as a function of plant size. The contractors' results for the overall efficiencies are in reasonable agreement considering the slight differences in their plant designs. NASA LeRC is reviewing cost and performance results for consistency with those of previous studies, including studies of conventional steam plants. LeRC in house efforts show that there are still many tradeoffs to be considered for these oxygen enriched plants and considerable variations can be made in channel length and level of oxygen enrichment with little change in overall plant efficiency.

N82-27876/3 PC **A03**/MF **A01**
Aeronautical Research Inst. of Sweden, Stockholm.
A Preliminary Estimation of the Expected Noise Levels from the Swedish Wind Energy Conversion System (Wecs) Prototypes Maglarp and Naesudden.
S. Soedeqvist. 13 Apr 82, 36p FFA-TN-1982-01
Contract NE-5062-101

Noise levels for horizontal axis turbines whose diameter = 75 m and electric power output = 2 to 3 MW were predicted. Noise criteria in view of Swedish regulations and the effects of wind dependent background noise are considered. Highest sound pressure levels are recorded downwind, due to source directionality. Wind also introduces downward refraction and extra damping due to prolonged propagation path. Unexpectedly large low frequency noise values can exist where blade passage frequency and natural vortex separation frequency are similar. Problems with unpleasant low frequency noise could be overcome by setting sound level maxima of 40 dBA or 55 dBC in urban areas, 35 dBA or 55 dBC in recreation areas, and by lowering these limits by 5 dB for impulse and tonal noise. Rise in background noise level caused by increased wind speed should be accounted for when setting limits.

10C. Energy Storage

AD-A117 684/1 PC **A02**/MF **A01**
GEO-Centers, Inc., Newton Upper Falls, MA.
Compatibility of Polyacetylene with Lithium Battery Materials.
Jul 82, 6p Rept no. GC-TR-82-288
Contract N00014-82-C-2124

The object of the research conducted under this contract is to evaluate polyacetylene (CHx) as a replacement for carbon as the cathode material in primary lithium/thionyl chloride (Li/SOC12) and lithium/sulfur dioxide (Li/SO2) batteries. The choice of the Li/SOC12 inorganic electrolyte cell is based on the fact that it is the highest energy density system known to date. By itself, the favorable ratio of obtainable work to weight is not sufficient. For Navy applications, the rate at which the cell supplies energy - the power density - is very important. CHx is a lightweight material with extremely high effective surface area (60 m squared/g) and good electrical conductivity when doped, thus making it a good candidate for an electrode in a high power density cell.

AD-A117 912/6 PC **A03**/MF **A01**
Aerospace Corp., El Segundo, CA. Chemistry and Physics Lab.
Short-Circuit Formation During NiCd Cell Reversal.
Technical rept.,
Albert H. Zimmerman, and Peter K. Effa. 20 May 82, 29p TR-0082(2945-01)-2, SD-TR-82-26
Contract F04701-81-C-0082

The reduction of Cd(OH)2 to cadmium at the nickel electrode in the NiCd cell has been found to compete with the hydrogen evolution reaction during cell reversal. This reduction reaction can lead to internal short circuits as cadmium dendrites bridge the separator. The cadmium metal short circuits are reoxidized when the cell is recharged and do not appear to have a significant short-term effect on cell performance. (Author)

DE82009857 MF **A01**
Energy Development Associates, Madison Heights, MI.
Development of the Zinc-Chloride Battery for Mobile Applications.
Dec 81, 274p DOE/ET/20131-1
Contract AC02-76ET20131
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The objectives of this program, to conduct research and development, build a zinc-chloride battery system for mobile application, and test the battery in an assigned vehicle, were accomplished. This effort, when combined with the additional building and testing of a solely Gulf+Western-funded preproduction battery in a specifically designed four-passenger vehicle, has shown that more than 150 miles at speeds of above 40 mph can be consistently reached. Further efforts can be expected to achieve a zinc-chloride battery with a range of more than 200 miles at the same or greater speeds. Testing of the privately-funded battery program is continuing. (ERA citation 07:043768)

DE82012896 MF **A01**
Army Electronics Research and Development Command, Fort Monmouth, NJ.
High-Cycle-Life, High-Energy-Density Nickel-Zinc Batteries. Report No. 5.
O. C. Wagner. Feb 82, 102p DOE/CH/10064-5
Contract AI02-80CH10064
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Available in microfiche only.

The ERADCOM nickel-zinc program, which is jointly funded by the Departments of Energy, Navy and Army, has resulted in the development of 5 ampere-hour nickel-zinc cells that have maintained 79% to 86% of initial capacity after 650 cycles on the C/3 80% DOD cycling regime. One cell is still delivering 70% of initial capacity after 880 cycles. This achievement is primarily due to the employment of an interrupted current (IC) charging mode on every cycle, the optimum frequency being 5 to 8 Hertz at a rest-to-pulse-ratio of 3/1, with charge control being by means of a GRL pressure switch attached to each cell at a cutoff pressure of 8 psig, and venting means at 10 psig. Design and performance characteristics of the battery are reported. (ERA citation 07:043767)

N82-27750/0 PC **A02**/MF **A01**
Societe Nationale Industrielle Aerospatiale, Les Mureaux (France).
Magnetic Bearing Flywheels for Electric Storage.
P. C. Poubeau. 1981, 11p SNIAS-821-422-110
Presented at Intern. Energy Agency Conf. On New Energy Conservation and Their Commercialization, Berlin, 6-10 Apr. 1981.

A magnetic bearing flywheel was designed. In order to have a simple, reliable system, magnetic suspension with a single servoloop for one degree of freedom of the rotor was used, four other degrees of freedom being controlled passively and the sixth one, corresponding to the rotation axis. The motor that transfers electric energy to the rotor is of the ironless brushless dc type with electronic commutation. It is operated alternatively for accelerating the wheel and then as a generator for delivering the stored energy. The use of high stress composite materials in the rotor greatly increases the operational limits of this equipment. Key characteristics of kinetic energy storage are mentioned along with a wide range of applications. Besides energy storage for satellites, these include power smoothing for solar and wind energy systems as well as backup power supplies, e.g., for electric vehicles.

PB82-255258 PC **A07**/MF **A01**
Commission of the European Communities, Luxembourg.
Investigation and Development of Systems for the Storage of Thermal Energy in the Temperature Range from -25C to +150C.
Final rept.,
P. Eckerlin, A. Klopfer, and J. Schroeder. Aug 82, 143p EUR-6936
Trans. of mono. Untersuchung und Entwicklung von Systemen zur Speicherung thermischer Energie im Temperaturbereich zwischen -25C und +150C, n.p. Jul 82 by P. Alcock. Prepared in cooperation with Philips Forschungslaboratorium G.m.b.H., Aachen (Germany, F.R.).
Customers in the European Community Countries should apply to the Office for official publications of the European Communities, B.P. 1003, Luxembourg.

Water, some salt hydrates and eutectic mixtures of the two with high heats of fusion and melting points between -50 and +130C were studied for the purpose of storing low-grade heat in residential energy systems. About 30 of these were selected and flexible flat-plate storage containers specially developed for them performed well over long periods in the laboratory. Over 30 reversible chemical reactions were also studied, all but one based on gas/solid or gas/liquid interaction. Chemical heat pump systems using heat from ambient

air or soil were also studied, whereby the latter gave the highest energy density. The volumes of the substances needed for a storage capacity of 1 MWh were calculated for some of the chemical systems having high storage densities. Finally, a system with moist soil as a storage medium surrounded by a layer of dry earth or foam insulation was discussed and compared with a water storage system.

PB82-255431 PC **A04**/MF **A01**
Deutsche Automobilgesellschaft m.b.H., Esslingen (Germany, F.R.).
Development of Gas-Phase Metallized Plaques for Electrodes of Storage Batteries, in Particular for Nickel Oxide Electrodes.
Final rept.,
R. Linkohr, and H. Schladitz. Aug 82, 75p BMFT-FB-T-81-053
Trans. of mono. Entwicklung von Gasphasenmetallisierten Geruestkoerpern fuer Elektroden Alkalischer Batterien, Insbesondere von Nickeloxid-Elektroden, Bonn, p1-87 Jun 81. See also N82-15585.

Nickel oxide-electrode plaques for alkaline batteries have been developed by CVD-plating fiber plaque substrates with nickel from nickelcarbonyo. Carbon felt proved to be a suitable substrate and large (22 x sq 15 sq cm) and thick 3 - 5 mm) plaques could be made from this material. Three metallization devices were constructed, one of which allowed continuous processing with carbonyl gas flowing through the felt; this improved evenness of nickel distribution. The physical properties of the plaques - structure, electric resistance, heat conduction, gas permeation - have been approximated by simple models and the corresponding calculations have been compared with measurements. Nickel oxide electrodes have been made from the plaques and have been cycled in half-cell arrangements. The project goals concerning nickel savings, capacity per unit area and current capability have been reached.

PB82-873951 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Battery Electrode Materials: Properties and Performance. 1975-August, 1982 (Citations from the International Information Service for the Physics and Engineering Communities Data Base).
Rept. for 1975-Aug 82.
Aug 82, 147p

This bibliography contains citations concerning properties and performance of electric battery electrode materials. Electrochemical and thermodynamic behavior, surface analysis, and materials tests are discussed. Discharge characteristics, electrode corrosion and kinetics, rechargeability, and x-ray analysis are included. (Contains 136 citations fully indexed and including a title list.)

PB82-873969 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Battery Electrode Materials: Properties and Performance. 1975-August, 1982 (Citations from the Engineering Index Data Base).
Rept. for 1975-Aug 82.
Aug 82, 273p

This bibliography contains citations concerning properties and performance of electric battery electrode materials. Research and development in electrode technology, chemical solutions, materials improvement, reactions, rechargeability, and reliability are discussed. Electrochemical and thermodynamical characteristics, materials testing and evaluation, and corrosion protection are included. (Contains 281 citations fully indexed and including a title list.)

11. MATERIALS

11A. Adhesives and Seals

AD-A117 598/3 PC **A03**/MF **A01**
General Electric Co., Syracuse, NY.
Glass-to-Metal Seal Quality.
Final technical rept. Feb 81-Feb 82,
L. Zakraysek, and H. Lin. May 82, 43p RADC-TR-82-93
Contract F30602-81-C-0104

Microelectronic packages with marginal glass-to-metal seals often escape detection at receiving inspection when they are tested by present methods for determining hermeticity. A more effective test method is desirable for fulfilling the requirement of effectively detecting marginal quality microelectronic package hermeticity. This final report describes the results of an extensive study of various dye penetrant materials and specially designed equipment in developing an optimum and effective liquid dye penetrant test method for determining the hermetic quality of various types of microelectronic packages. (Author)

N82-27487/9 PC **A02**/MF **A01**
National Timber Research Inst., Pretoria (South Africa).
Sulphited Wattle Tannin-Based Adhesives for Glulam Assembly.
F. A. Cameron, and A. Pizzi. Sep 80, 12p CSIR-SR-HOUT-209, ISBN-0-7988-2091-8

The manufacture of glued laminated beams of industrial dimensions with an adhesive based on sulphited wattle tannin, which at a 10% resorcinol content, can be cured at a temperature of 50 degrees C is discussed. Accelerated life weathering tests, moisture resistance tests, and shear strength tests are described.

N82-27488/7 PC **A02**/MF **A01**
National Timber Research Inst., Pretoria (South Africa).
Modified Fast-Setting Phenolic and Tannin-Based Adhesive Systems for Exterior Grade Finger Joints.
F. A. Cameron, and A. Pizzi. Dec 80, 20p CSIR-SR-HOUT-207, ISBN-0-7988-2074-8

Ten adhesive systems were tested on mechanically finger jointed South African Pine of dimensions 5,000 mm x 120 mm x 37 mm and Eucalyptus Saligna and Eucalyptus grandis, of dimensions 5,000 mm x 75 mm x 25 mm. All the adhesive systems tested performed sufficiently well in developing enough strength to allow short delay between assembling and machining or dispatching. These systems were unable to satisfy the requirements of the British Standard 1204 specification for close contact adhesives. The reason for the consistent failure of these systems to pass the beech strip cold water resistance test was investigated. The first series of tests was to assess the suitability of the beech strip test for adhesives to be used for end joint application. It was established that the beech strip test is suitable. The second series of tests involved improving the adhesive system to the extent that it consistently passed the British Standard BS 1204 specification. Since it was the cold water resistance test that always failed to meet the relevant specification, it appeared that the amount of cross linking in the adhesive was inadequate.

N82-27489/5 PC **A02**/MF **A01**
National Timber Research Inst., Pretoria (South Africa).
Fast-Setting Phenolic and Tannin-Based Honeymoon Adhesive Systems for Exterior Grade Glued Laminated Timber.
F. A. Cameron, A. Pizzi, and D. Mosterd. Feb 81, 14p CSIR-SR-HOUT-211, ISBN-0-7988-2098-5

A fast setting two component adhesive system was used to manufacture exterior grade finger jointed timber on an industrial scale. Ten different adhesive systems were tested at 25 C and found to build up sufficient strength to permit machining of the timber after a time delay of only half an hour to one hour. Although these adhesive systems worked well in end joint application, they were unable to pass the beech strip (Fagus sylvatica) test for close contact adhesives as specified in the British standard 1204, and in the provisional specification for synthetic resin adhesives for wood. Experiments conducted with two of the adhesive systems, applied to small, two layer beams, to determine the effectiveness of the system in glulam manufacture is discussed.

N82-27490/3 PC **A02**/MF **A01**
National Timber Research Inst., Pretoria (South Africa).
Minimum Curing Temperature of Cold-Setting and Fast-Setting Honeymoon Laminating Adhesives.
F. A. Cameron, and A. Pizzi. Feb 81, 22p CSIR-SR-HOUT-212, ISBN-0-7988-21027

The minimum curing temperature of two cold setting laminating adhesives and four fast setting 'honeymoon' adhesives, was determined by the ability of the adhesive system to meet the weather and boil proof requirements of the British standard specification BS 1204 for synthetic resins adhesive for close contact joints, and the South African Bureau of Standards provisional specification, for exterior grade wood adhesives at the temperature chosen. The cold setting wattle tannin based and phenolic one component adhesive cannot be cured at temperatures of 20 C and below. Two of the 'honeymoon' systems can be cured at temperatures above 15 C. One of the 'honeymoon' systems can be cured at temperatures above 10 C. The completely phenolic 'honeymoon' system can be cured at a temperature as low as 5 C and possibly lower with little reduction in the rate of development of bond strength.

N82-27491/1 PC **A02**/MF **A01**
National Timber Research Inst., Pretoria (South Africa).
The Relationship Between Resin Solids Content and Cured Strength of Two Cold-Setting Laminating Adhesives.
F. A. Cameron, and A. Pizzi. Mar 81, 16p CSIR-SR-HOUT-213, ISBN-0-7988-2108-6

The results of performance tests and adhesive strength tests of two cold-setting laminate adhesives are presented. The commercial wattle-tannin adhesive satisfies all the weather and boil proof requirements of the British standard specification BS 1204 in a percentage resin solids content range of 43% to 59%, and of the South African Bureau of Standards draft specification for exterior wood adhesives in a range of 53% to 59% resin solids content. The commercial phenol/resorcinol/formaldehyde adhesive satisfies all the weather and boil proof requirements of the British standard specification BS 1204 in a percentage resin solids content range of 42% to 54%, and of the South African Bureau of Standards draft specification for exterior wood adhesives at 52% and 54% resin solids content.

N82-27492/9 PC **A02**/MF **A01**
National Timber Research Inst., Pretoria (South Africa).
Variation in the Proportion of the a and B Components of Honeymoon Adhesive Systems Used for Exterior Grade Finger Joints.
F. A. Cameron, and A. Pizzi. Mar 81, 16p CSIR-SR-HOUT-215, ISBN-0-7988-2109

In the 'Honeymoon' adhesive systems the A component contains hardener so that an excess of A over B component, or lack of the B component results in slow curing but to a satisfactory strength. The B component does not contain hardener and therefore an excess of B component over A component results in very little or no curing. For this reason a wattle tannin based and a phenolic fast setting 'Honeymoon' adhesive system were tested to determine the maximum variation in proportion of B to A component at which the cured strength of the adhesive would be unaffected. The wattle tannin based adhesive system can be safely used at a 3:1 variation in proportion of B to A component. The phenolic adhesive system can be used at as much as a 5:1 variation in the proportion of B to A component.

PAT-APPL-6-308 201 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Elastomer Toughened Polyimide Adhesives.
Patent Application,

A. K. St.Clair, and T. L. St.Clair. Filed 2 Oct 81, 14p
N82-25384/0, NASA-CASE-LAR-12775-1
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A rubber-toughened addition type polyimide composition having excellent high temperature bonding characteristics in the fully cured state and improved peel strength and adhesive fracture resistance is discussed. The process for making the improved adhesive involves preparing the rubber containing amic acid prepolymer by chemically reacting an amine-terminated elastomer and an aromatic diamine with an aromatic dianhydride with which a reactive chain stopper anhydride has been mixed, and utilizing a solvent or mixture of solvents for the reaction.

PAT-APPL-6-314 334 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Self-Shoring Adhesive System.
Patent Application,
Richard J. Dick, and Edward C. Hobaica. Filed 23 Oct 81, 5p AD-D009 583/6
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A self-shoring adhesive system is provided for adhering rubber to steel in a marine environment. The adhesive composition is comprised of a DGEBA-type epoxy resin cured near stoichiometry with a polyamide resin and filled with a mixture of carbon black and a fumed colloidal silica. (Author)

PAT-APPL-6-378 533 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Huntsville, AL. George C. Marshall Space Flight Center.
Unitary Seal Ring Assembly.
Patent Application,
W. N. Myers, and L. A. Hein. Filed 13 May 82, 10p
N82-25517/5, NASA-CASE-MFS-25678-1
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A ring seal is installed in an annular recess for sealing the interface between the housing and a rotating or reciprocating shaft. The seal ring consists of a resilient and member having a metal ring wedge acting on it by a Belleville spring. The ring wedge has an elongated, annular projecting rib on each sloping side surface which projects into elongated annular slots along the sides forming the recess in the cup. The parts can be interlocked before installation in a unitary manner.

PB82-873118 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Wax Based Adhesives for Paper. 1972-August, 1982 (Citations from the Institute of Paper Chemistry Data Base).
Rept. for 1972-Aug 82.
Aug 82, 160p
Supersedes PB81-881344.

This bibliography contains citations concerning hot starch based adhesives, remoistenable adhesives, hot melt adhesive compositions, pressure sensitive label coatings and heat sealable coatings relative to chemical make-up, manufacture, performance, and applications. Utilization of wax based adhesives for paper products includes food packaging, paper laminates, decals, envelopes, tapes, copy paper, labels, wall covering and flexible packaging. Patents of US and foreign origin are included. (This updated bibliography contains 142 citations, 34 of which are new entries to the previous edition.)

11B. Ceramics, Refractories, and Glasses

AD-A117 463/0 PC **A06**/MF **A01**
Army Materials and Mechanics Research Center, Watertown, MA.
Characterization of Turbine Ceramics after Long-Term Environmental Exposure.
Final rept.,
George D. Quinn. Apr 80, 106p Rept no. AMMRC-TR-80-15
Contract EC-76-A-1017

An experimental program was conducted to investigate the possible degradation in mechanical properties of silicon-based ceramics exposed to high temperaiure oxidizing environments. Thirteen materials were studied, all with potential for use in energy conversion devices such as the gas turbine. The materials ranged from some of the better known silicon nitrides and carbides to experimental grades. Testing included flexural stress rupture at 1200 C and stepped temperature stress rupture (STSR) experiments. The latter test was devised for this study and is a variation of the stress rupture test in which a range of temperatures is employed. The purpose of the STSR test is to explore the potential stress/temperature regimes of static fatigue failure. In addition, a combined cycle durability sequence was applied to selected materials. This procedure is a simple service simulation involving static heat soaks and rapid thermal cycling on bend bars. In nearly all cases, material degradation and/or time-dependent failure was observed. Extensive fractography was conducted to identify mechanisms of failure. (Author)

AD-A117 733/6 PC **A05**/MF **A01**
Army Materials and Mechanics Research Center, Watertown, MA.
Silicon Nitride,
Donald R. Messier, and William J. Croft. 1982, 100p
Rept no. AMMRC-TR-82-42
Pub. in Preparation and Properties of Solid State Materials, v7 ch2 p131-220, 1982.

No abstract available.

DE82009721 PC **A02**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Stress Corrosion of a High-Transmittance Glass for Solar Applications.
R. T. Coyle, and J. D. O. McFadden. Mar 82, 22p
SERI/TP-255-1507, CONF-811013-23
Contract AC02-77CH00178
Electrochemical Society conference, Denver, CO, USA, 11 Oct 1981, Portions of document are illegible. Microfiche only after original copies are exhausted.

Measurements have been made of the stress corrosion coefficients A and n in the relationship v = AK/sub I//sup n/ (where v is the crack velocity and K/sub I/ is the stress intensity) as well as the critical stress intensity factor K/sub IC/, for a new flat glass for solar energy applications. It was found that this new glass, Corning Glass Works Code 7809, has an n of 26.6, versus 17.9 for soda-lime-silicate float glass. This implies that the 7809 has lower stress corrosion cracking susceptibility than the float glass. The critical stress intensity factor for the 7809 was 0.75 MP a sqrt m versus 0.71 for float glass. (ERA citation 07:046416)

DE82012066 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Glass Formulation and Melting at Sandia National Laboratories.
D. L. Stewart. Feb 82, 25p SAND-81-1940
Contract AC04-76DP00789
Portions of document are illegible.
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The physical aspects of making high quality glass and glass ceramic are discussed. The study includes a description of necessary equipment, the batching of raw materials, melting, stirring, fining, pouring, casting, annealing, and glass characterization. (ERA citation 07:044208)

N82-27461/4 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Effects of Various Additives on Sintering of Aluminum Nitride.
K. Komeya, H. Inoue, and A. Tsuge. Feb 82, 20p
NASA-TM-76650, NAS 1.15:76650
Contract NASW-3542
Transl. Into English from J. Of the Ceram. Soc. Of Japan (Japan), V. 89, No. 6, 1981 p 330-336. Transl. By Scientific Translation Service, Santa Barbara, Calif. Original DOC. Prep. By Toshiba Research and Development Center, Kawasaki, Japan.

Effects of thirty additives on sintering A/N were investigated. The addition of alkali earth oxides and rare earth oxides gave fully densified aluminum nitride. This is due to the formation of nitrogen-containing aluminate liquid in the system aluminum nitride-alkali earth oxides or rare earth oxides. Microstructural studies of the sintered specimens with the above two types of additives suggested that the densification was due to the liquid phase sintering. Additions of silicon compounds resulted in poor densification by the formation of highly refractory compounds such as A/N polytypes.

PB82-253782 PC **A07**/MF **A01**
Cambridge Univ. (England). Dept. of Engineering.
Deformation Mechanism Maps for Ceramics.
Final rept.,
H. J. Frost, and M. F. Ashby. May 81, 135p CUED/C/MATS/TR-79
Also pub. in ISSN-0309-6505.

Deformation mechanism maps for polycrystalline Si, Ge, ice and a number of carbides, oxides and alkali halides were presented. Maps were constructed from a compilation of data on the relations between (a) stress and temperature and (b) strain-rate and stress. The general features of deformation of each system were discussed in terms of creep rate behavior. The work was restricted to only one grain size for each system, except for ice, magnesia and alpha-alumina where the proliferation of different diffusional flow fields enabled construction of maps for various grain sizes (1 micrometers to 10 mm).

PB82-873910 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Nondestructive Testing of Ceramics. 1970-August, 1982 (Citations from the NTIS Data Base).
Rept. for 1970-Aug 82.
Aug 82, 146p
Supersedes PB82-854100.

This bibliography contains citations concerning the nondestructive techniques for testing or examining ceramic materials and ceramic bodies for the detection of flaws or defects. (This updated bibliography contains 105 citations, 12 of which are new entries to the previous edition.)

11C. Coating, Colorants, and Finishes

AD-A117 472/1 PC **A02**/MF **A01**
Ballistic Research Labs., Aberdeen Proving Ground, MD.
A New Type of EM Wave Absorbing Coating.
Conference paper,
Arthur Gauss, Jr. 18 Jun 82, 15p
Paper from the Proceedings of the Army Sciences Conference (1982), 15-18 Jun 82.

Research on radar anti-reflection coatings has been actively pursued both theoretically and experimentally since World War II. Interference, (1,2) dielectric (3), and magnetic-dielectric (4,5) absorptive coatings have been tried. Recently a new type of radar absorbing chaff (RAC) has been suggested (6). Calculations done at BRL indicate that by compacting the RAC filaments a new type of radar absorbing coating (called RACO) may be possible. The filaments would be fixed in a solid binder having near unity dielectric constant. The primary mechanism for attenuation of the incident radiation by a RAC cloud or RACO layer is by resistive dissipation in the relatively long, thin chaff filaments. The tiny RAC-RACO filaments have length to diameter ratios on the order of one thousand with diameters of about 500A. Filament separations in a RACO are about one-half to one-third of a filament length thus requiring the inclusion of dipole and perhaps higher order interactions. Each filament can be modeled simply as a series resistive-capacitive circuit, single filament theory will be discussed in Section II.

AD-A117 845/8 PC **A02**/MF **A01**
Pittsburgh Univ., PA. Dept. of Metallurgical and Materials Engineering.
Fundamental Research Directed to Advanced High Temperature Coating Systems Beyond the Current State-of-the-Art Systems.
Annual rept. no. 2, 1 Jan-31 Dec 81,
G. H. Meier, and F. S. Pettit. 1 Apr 82, 12p AFOSR-TR-82-0548
Grant AFOSR-80-0089

The oxidation behavoir of Ni-7.5 Si alloys has been studied in oxygen over the temperature range from 950 to 1150 deg C. The alloys exhibit significant transient oxidation but following this period oxidize at rates which are similar to those for A1203-forming systems. This slow rate is apparently due to the formation of sealing layer of Si02 at the alloy/scale interface. The sealing layer appears to be slightly permeable to Ni which results in continued formation of Ni0 at the scale gase interface.

DE82901246 MF **A01**
Tennessee Valley Authority, Chattanooga.
Development of a Dry Coating Process for Broadloom Carpet. Final Report.
29 Dec 81, 30p NP-2901246
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

The DASH coating process for carpets is described. In comparison to conventional latex coating systems, the DASH dry-applied thermoplastic fusion coating process has demonstrated energy savings of up to 80%; labor savings of 50% and coating material cost savings of up to 20%. The objective of this project is to complete the development of the DASH process so that it would be commercially available. Specifically, the goal is to increase looplock strength of carpets coated using the DASH process to high commercial standards (20 pounds). The DASH process utilizes electric power, thus saving substantial amounts of natural gas utilized in the latex process. Following a technical discussion, test conditions and experimental results are described. (ERA citation 07:044064)

N82-27409/3 PC **A02**/MF **A01**
National Timber Research Inst., Pretoria (South Africa).
Protection of Wood Surfaces with Metallic Oxides.
H. Kubel, and A. Pizzi. Sep 80, 24p CSIR-SR-HOUT-210, ISBN-7988-2092-6

Zinc oxide as well as lead (II), lead (IV) and tin (II) oxide react with quaiacol as a simple lignin model compound to form complexes. In comparison with results obtained with chromium trioxide, only zinc oxide gives worthwhile results when used to waterproof wood. Because of the (dimeric) character of the complex formed with lignin, zinc oxide is a less efficient wood waterproofer than CrO3, which instead forms (polymeric) complexes. A theory of the preservation effect of wood by metallic ion is advanced. Metallic compounds which are capable of further crosslinking the lignin network by forming insoluble complexes with it can act as wood waterproofers.

PAT-APPL-6-328 760 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Covering Solid, Film Cooled Surfaces with a Duplex Thermal Barrier Coating.
Patent Application,
C. H. Liebert. Filed 8 Dec 81, 9p N82-25463/2, NASA-CASE-LEW-13450-1
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A thermal barrier coating is applied to solid film cooled hardware. Also, thermal barrier coating systems are used to provide corrosion resistance and thermal protection to these base metal surfaces. An inert gas, such as argon, is discharged through the apertures during the application of the thermal barrier coating system by plasma spraying. This flow of inert gas reduces both blocking of the holes and base metal oxidation during the coating operation.

PB82-249640 PC **A05**/MF **A01**
Carnegie-Mellon Univ., Pittsburgh, PA.
Evaluation of Low Solvent Maintenance Coatings for Highway Structural Steel.
Final rept. Oct 78-Sep 81,
Joseph A. Bruno, Jr., and John D. Keane. Dec 81, 95p FHWA/RD-81/019
Contract DOT-FH-11-9468

Organic solvents released from maintenance coatings for structural steel contribute to air pollution and are increasingly subject to environmental restrictions. Current and anticipated coatings technologies and regulations were therefore evaluated to determine their probable impact upon highway bridge painting practices. The industry has diverted major research efforts toward developing of coatings having low solvent content and freedom from lead, chromate, carcinogens and other suspect materials. Most promising technologies include water-borne solutions and latices as well as re-formulations with chlorinated solvents for mild and moderate environments; water-thinned zinc-rich paints, water-borne and high-solid epoxies for more severe environments. Water-borne systems are being evaluated on more than 25 bridges, principally in California and Florida.

PB82-250010 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Development of a Test Apparatus and Method for Measuring Adhesion of Protective Coatings.
James F. Seiler, Mary E. McKnight, and Larry W. Masters. Jul 82, 40p NBSIR-82-2535
Prepared in cooperation with Tri-Services Building Materials Investigation Program Committee.

A pneumatic test apparatus and associated test method for measuring the adhesion of coatings have been developed with particular emphasis on: (1) overcoming some of the shortcomings of existing tests; and (2) providing a method which can provide quantitative information for both laboratory and field applications. The test apparatus utilizes compressed air to lift a stainless steel loading fixture (button) which is bonded with an adhesive to the surface of the protective coating. The rate at which the loading fixture is loaded is controlled by a precision air pressure gauge and the tensile force required to lift the button from one coating is measured. Assuming the level of adhesion of the adhesive to the coating is greater than that of the coating to the substrate, the tensile force provides a measure of the coating adhesion. Laboratory studies with two coating materials have been performed to assess the method. This report describes the test apparatus and associated test method and presents test data obtained to date, proposed modifications to the initial test apparatus design, and additional research needs. An Instruction Manual for use of the test apparatus is included in the Appendix.

PB82-873530 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Sputter Coating of Tantalum and Tantalum Compounds. 1970-August, 1982 (Citations from the NTIS Data Base).
Rept. for 1970-Aug 82.
Aug 82, 95p
Supersedes PB81-861304.

This bibliography contains citations concerning the properties of tantalum and tantalum compound films formed by sputtering techniques. Included are topics such as type of technique used, electrical, magnetic, and dielectric properties. Tantalum compounds studied include nitrates, oxides, and aluminides. The structural properties of sputtered films are also discussed. (This updated bibliography contains 69 citations, 24 of which are new entries to the previous edition.)

PB82-873548 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Sputter Coating of Tantalum and Tantalum Compounds. 1970-August, 1982 (Citations from the Engineering Index Data Base).
Rept. for 1970-Aug 82.
Aug 82, 122p
Supersedes PB81-861320.

This bibliography contains citations concerning the properties of tantalum and tantalum compound films formed by sputtering techniques. Included are topics such as type of technique used, electrical, magnetic, and dielectric properties. Tantalum compounds studied include nitrates, oxides, and aluminides. The structural properties of sputtered films are also discussed. (This updated bibliography contains 123 citations, 27 of which are new entries to the previous edition.)

PB82-873845 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Sputter Coating of Tantalum and Tantalum Compounds. 1976-August, 1982 (Citations from the Energy Data Base).
Rept. for 1976-Aug 82.
Aug 82, 107p
Supersedes PB81-861312.Prepared in cooperation with the Department of Energy, Washington, DC.

This bibliography contains citations concerning the properties of tantalum and tantalum compound films formed by sputtering techniques. Included are topics such as type of technique used, electrical, magnetic, and dielectric properties. Tantalum compounds studied include nitrates, oxides, and aluminides. The structural properties of sputtered films are also discussed. (This updated bibliography contains 96 citations, 37 of which are new entries to the previous edition.)

11D. Composite Materials

AD-A117 366/5 PC **A07**/MF **A01**
Pennsylvania State Univ., State College. Applied Research Lab.
The Carbonization and Graphitization of Phenanthrene.
Technical memo.,
Timothy J. Peters. 23 Feb 82, 143p Rept no. ARL/PSU/TM-82-83
Contract N00024-79-C-6043

The carbonization of phenanthrene and the effect of carbonization conditions on the formation of cokes and graphites were studied. Phenanthrene is an organic precursor predominant in coal-tar pitches, that are used in the production of graphite electrodes and as the binder in carbon-carbon composites.

AD-A117 372/3 PC **A04**/MF **A01**
Lehigh Univ., Bethlehem, PA. Inst. of Fracture and Solid Mechanics.
Transient Hygrothermal Stresses in a Traction Free Slab: Moisture-Temperature-Deformation Coupling Effects.
Final rept. 31 Jul 80-30 Jul 81,
G. C. Sih, and M. T. Shih. Apr 82, 51p AMMRC-TR-82-25
Contract DAAG46-80-C-0062

This effort is a part of the Predictive Response Capability Development program with the objective of incorporating environment effect into design criteria. Previous work has shown that the effects of moisture and temperature interaction cannot be adequately treated by the simple (Fickian) diffusion theory. The coupling between moisture and temperature can significantly influence the resulting stress distribution in the solid, particularly under transient temperature boundary conditions. This paper considers a more complete theory in which deformation of the solid is also assumed to interact with the moisture-temperature diffusion process. The system of governing equations are solved numerically by iteration using Laplace transforms and the technique of finite elements. Coupling effects are analyzed for a traction free slab made of 5208 epoxy resin material subjected to a sudden change of moisture or temperature on the surface. Variations of moisture, temperature and stress with time and space variable are displayed graphically. The influence of coupling is found to vary in both time and space and increases as the specified transient moisture and temperature conditions become more severe. It also tends to delay the time for the hygrothermal stress to reach equilibrium. (Author)

AD-A117 697/3 PC **A02**/MF **A01**
Materials Research Labs., Ascot Vale (Australia).
A Semi-Analytical Model for Laser-Induced Ablation of Fibre-Resin Composites,
K. C. A. Crane. Mar 82, 19p Rept no. MRL-R-844

Laser-induced ablation of fibre-resin composites is considered using a steady-state, one-dimensional model. In the analysis, it is attempted to clarify the physical and chemical aspects of ablation rather than to predict ablation rates. it is shown how suitable measurements may be used in conjunction with this model to determine loss rates for combined gaseous and combined non-gaseous products of ablation, and to determine the average enthalpy of each of these two losses. The model is restricted to incident irradiances in excess of approximately 30 MW per square m and to cases in which the ablation rate varies with irradiance in a linear fashion. Because some of the required measurements may be difficult to make accu-

rately, this analysis should be regarded as a preliminary to more detailed work. (Author)

AD-A117 731/0 PC **A02**/MF **A01**
Utah Univ., Salt Lake City. Dept. of Civil Engineering.
Fatigue of Laminated Composite Structures.
Final rept. 24 Oct 79-23 Apr 82,
George J. Dvorak. Jul 82, 17p UTEC-82-063, ARO-17126.4-EG
Contract DAAG29-79-C-0049

The purpose of the work supported by this contract was to investigate the mechanisms of fatigue in fibrous metal matrix composites and laminates. The approach to the problem was based on two simultaneous research efforts. In the theoretical part of the program, the elastic-plastic behavior of unidirectional and laminated composites was described with the help of the Vanishing Fiber Diameter (VFD) model. The model simplifies the geometry of the microstructure by assuming that each of the reinforcing fibers has a vanishingly small diameter and that the fibers occupy a finite volume fraction of the composite. Thus the strain fields in both fiber and matrix are uniform. Overall constitutive equations of the elastic-plastic composite aggregate were derived from the properties of the constituents, their volume fractions, and geometry of the microstructure. The theory was extended to the case of in-plane mechanical loading of symmetric laminated plates. Also, a finite element code for three-dimensional analysis of elastic-plastic composite structures was developed and used in selected applications, which included investigations of stress fields at circular holes and cracks in laminated plates. Shakedown limits of certain laminated plates used in the experiments were also established. Work was started on analysis of distributed fracturing in unidirectional composites.

AD-A117 741/9 PC **A03**/MF **A01**
Brown Univ., Providence, RI. Div. of Engineering.
An Investigation of Interfacial Reactions in Metal Matrix Composites.
Final rept. 1 Apr 80-30 Jun 81,
Sung Chor Chin, and Marc H. Richman. Mar 82, 34p AMMRC-TR-82-14
Contract DAAG46-80-C-0027

The interfacial reaction between fibre and matrix materials was studied in G/Al and FP/Mg composite systems. An intermediate layer of reaction product was necessary to prevent debonding in G/Al composites during cooling from the fabrication temperature. The intermediate layer was identified as the spinel MgAl2O4 in the FP/Mg composite and the effect of this intermediate layer was to provide good bonding and load transfer from matrix to fibre and also to form bridges (necks) cross-linking the fibres. The spinel also acted as a diffusion barrier to reduce the role of fibre degradation by interfacial reaction at service temperatures. (Author)

AD-A117 869/8 MF **A01**
Air Force Wright Aeronautical Labs., Wright-Patterson AFB, OH.
Instructions for TI-59 Combined Card/Module Calculations for In-Plane and Flexural Properties of Symmetric Laminates. Revised.
Final technical rept. for period ending May 82,
Steven L. Donaldson. Jun 82, 130p Rept no. AFWAL-TR-82-4081
Supersedes AD-A107 984.
Availability: Microfiche copies only.

This report is an updated and expanded version of AFWAL-TR-81-4116. It contains descriptions and step-by-step instructions for the simple, combined use of magnetic cards with the composite materials module, designed for use in TI-59 programmable calculators. Users do not have to be familiar with TI-59 programming. These programs contain the key calculations of the stiffness and strength of unidirectional and symmetrially laminated composites, including sandwich core laminates. Both in-plane and flexural loadings can be applied, giving in-plane and flexural response. Instant calculations can be made for practical use. With the use of a printer, the results can be immediately and permanently recorded. The equation numbers in this report are from Introduction to Composite Materials by Tsai and Hahn, published by Technomic Publishing Company, Westport, Connecticut, July 1980. (Author)

AD-A117 902/7 PC **A03**/MF **A01**
Air Force Wright Aeronautical Labs., Wright-Patterson AFB, OH.
Mechanical Properties of E293/1581 Fiberglass-Epoxy Composite and of Several Adhesive Systems.
Final rept. Jun 80-Sep 81,
David C. Watson. May 82, 50p Rept no. AFWAL-TR-82-4013

Mechanical properties have been generated on E293/1581 fiberglass-epoxy composite and several different adhesive systems. Three flat panels of this composite were supplied. Several panels having adhesive joints were also supplied having the E293/E-glass fabric composite laminates bonded; to itself, to steel, and to aluminum honeycomb material. Several types of adhesives, both film and foam adhesives, were used in bonding the single lap joint panels and the composite-honeycomb sandwich panel. Tensile, flexure, and interlaminar shear data were obtained on specimens removed from the flat panels parallel to the warp fabric direction and at room temperature and 280 deg F (138 degrees C). Single lap shear tests were conducted on specimens removed from the adhesively bonded panels. Three point flexure and edgewise compression tests were conducted on specimens removed from the composite-aluminum honeycomb sandwich panel. (Author)

AD-A117 946/4 PC **A03**/MF **A01**
Oklahoma Univ., Norman. School of Aerospace, Mechanical and Nuclear Engineering.
Research on Dynamics of Composite and Sandwich Plates, 1979-1981.
Technical rept.,
C. W. Bert. Jul 82, 40p Rept nos. OU-AMNE-82-3, TR-27
Contract N00014-78-C-0647

This report presents a survey of the literature concerning dynamics of plate-type structural elements of either composite material or sandwich construction. Papers from mid-1979 through early 1982 are reviewed, as are a few 1978 and early 1979 references unavoidably omitted in 1979 (Technical Report No. 5); there is a total of 167 references. Particular attention is given to experimental research and to linear and nonlinear analysis. Configurations include rectangularly orthotropic, cylindrically orthotropic, and anisotropic plates; laminated; plates; and thick and sandwich plates. Free and forced vibration, panel flutter, and impact are considered. (Author)

N82-27410/1 PC **A04**/MF **A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Engineering Science and Mechanics.
Advances in Moire Interferometry for Thermal Response of Composites.
Interim Report.
E. W. Brooks, Jr., C. T. Herakovich, D. Post, and M. W. Hyer. Mar 82, 75p NASA-CR-169121, NAS 1.26:169121
Contract NCC1-15

An experimental technique for the precise measurement of the thermal response of both sides of a laminated composite coupon specimen uses Moire interferometry with fringe multiplication which yields a sensitivity of 833 nm (32.8 micro in.) per fringe. The reference gratings used are virtual gratings and are formed by partially mirrorized glass prisms in close proximity to the specimen. Results are compared with both results obtained from tests which used Moire interferometry on one side of composite laminates, and with those predicted by classical lamination theory. The technique is shown to be capable of producing the sensitivity and accuracy necessary to measure a wide range of thermal responses and to detect small side to side variations in the measured response. Tests were conducted on four laminate configurations of T300/5208 graphite epoxy over a temperature range of 297 K (75 F) to 422 K (300 F). The technique presented allows for the generation of reference gratings for temperature regimes well outside that used in these tests.

N82-27486/1 PC **A02**/MF **A01**
North Carolina State Univ. at Raleigh. Dept. of Mathematics.
Effect of 1.33 Mev gamma Radiation and 0.5 Mev Electrons on the Mechanical Properties of Graphite Fiber Composites.
R. E. Fornes, J. D. Memory, and N. Naranong. 1982, 17p NASA-CR-169117, NAS 1.26:169117
Grant NSG-1562-S2

Epoxy/graphite fiber, polyimide/graphite fiber, and polysulfone/graphite fiber composites were exposed to 1.33 Mev gamma irradiation and 0.5 Mev electron bombardment for varying periods of time. The effects of the irradiation treatments on the breaking stress and Young's modulus were studied by a three point bending test. Effects were small; both electron radiation up to 5000 Mrad and gamma radiation up to 350 Mrad resulted in slight increases in both stress and modulus.

PAT-APPL-6-325 934 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Graphite/Polyimide Structural Applications.
Patent Application,
R. M. Baucom, and P. W. Kidder. Filed 30 Nov 81, 16p N82-25324/6, NASA-CASE-LAR-12547-1
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An article of manufacture comprising a stabilized graphite/polyimide composite preform and the process for making same is disclosed. Sheets of graphite/polyimide prepreg are layered in a desired orientation and staged in an air circulation oven, under modest vacuum pressure and temperature to reduce the solvent content therein to less than one percent and to convert at least 25% of the resin to the oligomer form. The resulting preform is stable and may be stored under ambient conditions for an extended period of time without losing its desirable physical property characteristics. The preform may then be placed in the mold cavity of a preheated tool and shaped to desired contour by platen press-type curing methods. The preforming process stabilizes the fiber/polyimide prepreg and eliminates the need for the immediate use of prepregs as they are formed to prevent deterioration.

PB82-255514 PC **A12**/MF **A01**
Versar, Inc., Springfield, VA.
Assessments of Future Environmental Trends and Problems of Increased Use, Recycling, and Combustion of Fiber-Reinforced, Plastic and Metal Composite Materials.
Final rept.,
George Provenzano. 14 Jul 82, 266p EPA/600/8-82/019
Contract EPA-68-02-3636

The purpose of the study is to identify and define future environmental concerns related to the projected utilization, recycling, and combustion of composite materials. The study is being conducted for the Office of Strategic Assessment and Special Studies (OSASS) of the U.S. Environmental Protection Agency (EPA). Based on results of the study, EPA will make a preliminary determination of whether further study is warranted for any of the potential environmental concerns that the study identified as being associated with composite materials use and disposal and assign research priorities in this area.

PB82-873696 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Pultrusion of Reinforced Plastics. 1973-August, 1982 (Citations from the Rubber and Plastics Research Association Data Base).
Rept. for 1973-Aug 82.
Aug 82, 116p
Supersedes PB81-880833.

This bibliography contains citations concerning the state of the art in reinforced plastics pultrusion technology. Processes, applications and materials utilized in the pultrusion of reinforced plastics are presented. Resins, reinforcing agents, tooling innovations and machinery developments are also considered. (This updated bibliography contains 134 citations, 30 of which are new entries to the previous edition.)

PB82-874017 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Nondestructive Testing of Composite Materials. 1970-August, 1982 (Citations from the NTIS Data Base).
Rept. for 1970-Aug 82.
Aug 82, 183p
Supersedes PB82-854134.

This bibliography contains citations concerning the nondestructive techniques for testing or examining a wide variety of composite materials. Topics discuss the detection of flaws or defects which affect the me-

chanical properties and behavior of composite materials. (This updated bibliography contains 142 citations, 14 of which are new entries to the previous edition.)

11E. Fibers and Textiles

PB82-254319 PC **A02**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Strength Testing of Geotechnical Fabrics.
Interim rept.,
A. McGown, K. Z. Andrawes, R. F. Wilson-Fahmy, and K. C. Brady. c1981, 24p TRRL/SR-703
Also pub. in ISSN-0305-1315. Prepared in cooperation with University of Strathclyde, Glasgow (Scotland).

A review was carried out of manufacturing methods for geotechnical fabrics and tests to define their load-extension properties. Some fabrics have complex three-dimensional structures and most are unlikely to be uniform or isotropic. Current test methods do not enable the load-extension behavior to be studied while the fabric is subjected to the normal compressive stresses acting through soil when the fabric is in service. It was judged that data from such tests might not be suitable for design purposes and of current test methods the simple uniaxial stress test appeared to be the most appropriate for quality control work. The results of a series of uniaxial stress tests using BIDIM needle punched fabric indicated that the minimum dimensions of test specimens should be 100 mm (long) and 200 mm (wide).

PB82-254327 PC **A02**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
A New Method of Determining the Load-Extension Properties of Geotechnical Fabrics.
Final rept.,
A. McGown, K. Z. Andrawes, R. F. Wilson-Fahmy, and K. C. Brady. c1981, 20p TRRL/SR-704
Also pub. in ISSN-0305-1315. Prepared in cooperation with University of Strathclyde, Glasgow (Scotland).

A new testing technique was developed to study the strength of geotechnical fabrics while the fabric is subjected to a normal compressive stress acting through a soil medium. The new in-soil, uniaxial test apparatus was used to investigate the load-extension behavior of two woven and two non-woven fabrics. Although the load-extension behavior of the woven fabrics was found to be significantly affected by the orientation of the test specimens it was not influenced by the level of the compressive stress. By contrast, the non-woven fabrics proved to be essentially isotropic, but the effect of confining pressure on the load-extension properties was quite marked. The authors concluded that further factors requiring study were: influence of soil type, rate of strain and effects of cyclic loading.

11F. Metallurgy and Metallography

AD-A117 451/5 PC **A06**/MF **A01**
Southwest Research Inst., San Antonio, TX.
Research on Multi-Ion Interactions and Defects in Metals.
Final rept. 15 Mar 73-9 May 82,
R. E. Beissner. 9 Jul 82, 108p ARO-16387.4-PH, ARO-10993.3-PH, ARO-13061.3-PH
Contracts DAAG29-79-C-0099, DAAG29-76-C-0031
Sponsored in part by Contract DAHC04-73-C-0022.

A summary of research on multi-ion interactions is presented. Emphasis is placed on point defects in nontransition metals and the calculation of screening charge densities, electric field gradients and lattice distortion. Multi-ion interactions in transition metals are also treated, as are calculations of stacking-fault energies in both transition and nontransition metals. (Author)

AD-A117 581/9 Not available NTIS
American Univ., Washington, DC. Dept. of Chemistry.
Alteration of Corrodent Ion Species within Stress Corrosion Cracks,
Trung H. Nguyen, B. F. Brown, and R. T. Foley. 9 Oct 81, 3p ARO-15539.5-MS
Contract DAAG29-80-C-0148
Availability: Pub. in Jnl. of the Electrochemical Society, v129 n4 p780-781 Apr 82 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A117 582/7 Not available NTIS
American Univ., Washington, DC. Dept. of Chemistry.
On the Nature of the Occluded Cell in the Stress Corrosion Cracking of AA 7075-T651-Effect of Potential, Composition, Morphology,
T. H. Nguyen, B. F. Brown, and R. T. Foley. Nov 81, 9p ARO-15539.6-MS
Contract DAAG29-80-C-0148
Availability: Pub. in Corrosion, v38 n6 p319-326 Jun 82 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A117 589/2 PC **A04**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Thermal Martensitic Transformation Cycling in Cu-Zn-Al Shape Memory Alloys.
Master's thesis,
William E. Muesing. Mar 82, 62p

The effect of multiple thermal cycles between the martensitic phase and parent phase of selected Cu-Zn-Al alloys was studied. As thermal cycling progressed the martensite start temperature (Ms), parent phase finish temperature (Af), and the temperature at which the maximum martensitic peak height occurred (Mmax) were all observed to shift upward.

AD-A117 742/7 PC **A03**/MF **A01**
GEO-Centers, Inc., Newton Upper Falls, MA.
The Effect of Carbon and Boron on the Friction Behavior of Ti-Implanted 52100 Bearing Steel at Low Sliding Speeds,
Russell A. Jeffries, Robert N. Bolster, and Irwin L. Singer. May 82, 33p Rept no. GC-TR-82-184
Contract N00173-80-C-0417

The low speed friction behavior of Ti implanted AISI 52100 bearing steel (1.5% Cr, 1% C by weight) may be altered by varying the concentration and distribution of the titanium and carbon present in the surface. With the aid of carbon which is either directly implanted or gettered during the implantation process, wear resistant, low friction surfaces may be produced. By assuring a sufficient supply of carbon, the Ti dosage required to produce a wear resistant surface may be reduced by more than 50%. Transmission electron microscopy of dual implants of carbon and titanium each at a dose of 2 x 10 to the 17th power showed that the surface was still crystalline and typical for a martensitic material. In contrast, friction testing of samples implanted with titanium and boron, another interstitial species forming wear resistant species (i.e., TiB2)), did not produce surfaces which were wear resistant nor substantially reduce the friction. Auger analysis in conjunction with ion milling was used to compare compositions of implanted surfaces.

AD-A117 783/1 PC **A02**/MF **A01**
Rutgers - The State Univ., New Brunswick, NJ. Dept. of Mathematics.
Kinetics of an Order-Disorder Transition,
M. K. Phani, Joel L. Lebowitz, M. H. Kalos, and O. Penrose. 6 Mar 80, 5p AFOSR-TR-82-0599
Grant AFOSR-78-3522
Pub. in Physical Review Letters, v45 n5 p366-369, 4 Aug 80.

No abstract available.

AD-A117 785/6 PC **A02**/MF **A01**
Rutgers - The State Univ., New Brunswick, NJ. Dept. of Mathematics.
Dynamics of a Two-Dimensional Order-Disorder Transition,
Paramdeep S. Sahni, Gregory Dee, J. D. Gunton, M. Phani, and Joel L. Lebowitz. 25 Sep 80, 11p AFOSR-TR-82-0607
Contract DE-AC02-76ER03077, Grant AFOSR-78-3522
Pub. in Physical Review B, v24 n1 p410-418, 1 Jul 81. Sponsored in part by Grant NSF-DMR78-0720.

No abstract available.

AD-A117 787/2 PC **A02**/MF **A01**
Rutgers - The State Univ., New Brunswick, NJ. Dept. of Mathematics.
Dynamical Scaling of Structure Function in Quenched Binary Alloys,
Joel L. Lebowitz, J. Marro, and M. H. Kalos. 24 Feb 81, 16p AFOSR-TR-82-0597
Contract DE-AC02-76ER03077, Grant AFOSR-78-3522
Pub. in Acta Metallurgica, v30 p297-310 1982.

No abstract available.

AD-A117 860/7 Not available NTIS
Portland State Univ., OR. Dept. of Physics.
Improving Efficiency of Cr Plating with Higher Sulfate and Cr (III),
A. Kasaaian, and J. Dash. 1982, 18p ARO-15104.4-MS
Contract DAAG29-81-C-0027
Availability: Pub. in AES 69th Annual Technical Conference Proceedings, p1-17 Jun 82 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A117 901/9 PC **A04**/MF **A01**
Ultrasonics International, Inc., Trevose, PA.
Ultrasonic Measurement of Case Depth in Case Hardened Steels. Evaluation of Feasibility for the Ultrasonic Measurement of Case Depth in Case Hardened Steels.
Final rept. Jan-Jun 82,
Morris S. Good. Jul 82, 55p
Contract N00014-82-C-0144

Various methods have been proposed for measuring case depth in case hardened steels. Each mehtod as described in past literature is restricted in practical application due to problems in area localization, geometry, sensitivity, compositional changes due to carbon and/or nitrogen gradients formed during the hardening process.

DE82006201 PC **A05**/MF **A01**
IIT Research Inst., Chicago, IL.
Corrosion and Degradation of Materials in the CONOCO DOAL CO sub 2 -Acceptor Coal-Gasification Plant.
R. Yurkewycz, R. F. Firestone, and K. J. Barton. Aug 81, 84p DOE/ET/10670-T1
Contract AC05-76ET10670
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Microfiche only after original copies are exhausted.

Corrosion specimens were exposed to the operating environments in the CONOCO COAL (CO sub 2 -Acceptor) coal gasification plant between 1974 and 1977. The plant operated on the CO sub 2 -Acceptor principle. Metal and refractory specimens were exposed in the gasifier and the regenerator vessels. Metal specimens only were exposed in the gasifier and regenerator quench towers. Exposure times ranged from 740 h to 2990 h. In the regenerator, poor performance was exhibited by the alloys HC-250, HL-40, and aluminized 310 and 800, while Alloy 671 proved to be inadequate in all cases. In comparison, the gasifier environment was less severe for most materials. Alloys 671, X, 800, and 793 gave consistently low corrosion rates of <20 mpy. Austenitic stainless steels, titanium, Alloy 825, and 20Cb-3 experienced only limited corrosion losses in both quench systems. Refractory performance studies showed that materials containing in excess of 60% alumina and less than 30% porosity demonstrated resistance to the gasifier and regenerator environments. Examples are Monofrax A and Alumex P-8. A significant number of the more resistant refractories, such as Wasp 60 and Chemal 111, were phosphate bonded. (ERA citation 07:048996)

DE82009069 PC **A03**/MF **A01**
Los Alamos National Lab., NM.
Fused Salt Processing of Impure Plutonium Dioxide to High-Purity Plutonium Metal.
L. J. Mullins, D. C. Christensen, and B. R. Babcock. Jan 82, 26p LA-9154-MS
Contract W-7405-ENG-36
Portions of document are illegible.

A process for converting impure plutonium dioxide (approx. 96% pure) to high-purity plutonium metal ($>99.9\%$) was developed. The process consists of reducing the oxide to an impure plutonium metal intermediate with calcium metal in molten calcium chloride. The impure intermediate metal is cast into an anode and electrorefined to produce high-purity plutonium metal. The oxide reduction step is being done now on

a 0.6-kg scale with the resulting yield being >99.5%. The electrorefining is being done on a 4.0-kg scale with the resulting yield being 80 to 85%. The purity of the product, which averages 99.98%, is essentially insensitive to the purity of the feed metal. The yield, however, is directly dependent on the chemical composition of the feed. To date, approximately 250 kg of impure oxide has been converted to pure metal by this processing sequence. The availability of impure plutonium dioxide, together with the need for pure plutonium metal, makes this sequence a valuable plutonium processing tool. (ERA citation 07:044169)

DE82012236 MF **A01**
Sandia National Labs., Livermore, CA.
Roll Extrusion of Aluminum Alloy 6061. Effects of Cold Reduction and Heat Treatment.
M. W. Mote. Feb 82, 17p SAND-81-8035
Contract AC04-76DP00789
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A tubular part over a meter long and nearly a half meter in diameter with several different internal diameters was made by internal roll extrusion, achieving external dimensions without subsequent machining and requiring only local machining internally. Excellent mechanical properties were obtained. In addition, an experiment was completed demonstrating a variety of properties achieved by variations in cold reduction and heat treatment. (ERA citation 07:044185)

DE82012889 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Results of U-Bend Stress-Corrosion-Cracking Specimen Exposures in Coal-Liquefaction Pilot Plants.
V. B. Baylor, J. R. Keiser, M. D. Allen, M. Howell, and J. F. Newsome. Apr 82, 40p ORNL/TM-8194
Contract W-7405-ENG-26
Microfiche only after original copies are exhausted.

Pilot plants with capacities of up to 600 tons/d are currently demonstrating the engineering feasibility of several coal liquefaction processes including Solvent Refined Coal (SRC), Exxon Donor Solvent (EDS), and H-Coal. These plants are the first step toward commercial production of synthetic fuels. Among other factors, development of the technology depends on reliable materials performance. A concern is the application of those austenitic stainless steels necessary for general corrosion resistance, because they are susceptible to stress corrosion cracking. This cracking results from tensile stresses in combination with offensive agents such as polythionic acids, chlorides, and caustics. To screen candidate construction materials for resistance to stress corrosion cracking, we exposed racks of stressed U-bend specimens in welded and as-wrought conditions at four coal liquefaction pilot plants. Results from exposures through June 1980 were described in a previous report for exposures in the SRC plants. This report summarizes the on-site test results from June 1980 through October 1981 for the two SRC pilot plants and the H-Coal and Exxon coal liquefaction pilot plants. (ERA citation 07:042099)

DE82701222 PC **A06**/MF **A01**
Israel Atomic Energy Commission, Beersheba. Nuclear Research Center-Negev.
Hydrogenations of Alloys and Intermetallic Compounds of Magnesium.
Z. Gavra. Aug 81, 105p NRCN-502
In Hebrew.Thesis.
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

A kinetic and thermodynamic study of the hydrogenation of alloys and intermetallic compounds of magnesium is presented. It was established that the addition of elements of the IIIA group (Al, Ga, In) to magnesium catalyses its hydrogenation. This is explained by the mechanism of diffusion of magnesium cation vacancies. The hydride Mg sub 2 NiH sub 4 was characterized by thermal analysis, x-ray diffraction and NMR measurements. The possibility of forming pseudobinary compounds of Mg sub 2 Ni by the substitution of nickel or magnesium was examined. The hydrogenation of the inter-metallic compounds of the Mg-Al system was investigated. It was found that the addition of indium and nickel affected the hydrogenation kinetics. A preliminary study of the hydrogenation of various binary and ternary alloys of magnesium was carried out. (Atomindex citation 13:658554)

DE82701488 PC **A03**/MF **A01**
UKAEA Atomic Energy Research Establishment, Harwell (England). Metallurgy Div.
Study of Long Term Ageing Effects in A533B Class 1 and A508 Class 3 Steels.
S. G. Druce. Aug 81, 38p AERE-R-10252
U.S. Sales Only.

The effects of long term thermal ageing treatments on notched impact fracture properties has been studied in two commercially produced PWR pressure vessel steels, A533B Class 1 and A508 Class 3. Heat treatments of up to 10,000h duration at temperatures between 300 and 600 exp 0 C have been investigated. Additionally the effects of specimen size, specimen orientation, specimen position from within the plate and the effect of a prior post weld heat treatment on subsequent fracture behaviour following thermal ageing have been evaluated for the A533B Class 1 material. The susceptibility of both materials to temper embrittlement effects is relatively low, the maximum increase in transition temperature following thermal ageing treatments in the temperature range 300 to 500 exp 0 C being about 40 to 45 exp 0 C. Thermal ageing at 600 exp 0 C for times in excess of 100h produces microstructural changes resulting in larger increases in transition temperature. For the A533B material, specimen position and orientation are found to have a large influence on impact behaviour but do not affect the susceptibility to temper embrittlement. Post weld heat treatment has little or no influence on impact fracture behaviour before further isothermal ageing treatments nor on susceptibility to temper embrittlement. (Atomindex citation 13:661266)

DE82780325 MF **A01**
Associacao Brasileira de Metais, Sao Paulo.
Spectrophotometric Analysis of Boron in Steels Using the Diantrimide Method.
R. A. Villanova, E. S. Silveira, and N. B. Bonatto. 1980, 16p INIS-mf-6758
In Portuguese.
U.S. Sales Only. Available in microfiche only.

The trials carried out by the Analytical Laboratory of Acos Finos Piratini, in order to choose a rapid and precise method for the boron determination on carbon and stainless steel are presented. Three photometric methods were experimented: The first one, using the curcumin reagent in a distillation procedure; the second a direct determination, also using curcumin; and the third method using the diantrimid reagent and without utilization of special analytical apparatus. The diantrimid method was the best one considering the results achieved, either as soluble or unsoluble boron. (Atomindex citation 13:647151)

DE82780445 MF **A01**
GKSS - Forschungszentrum Geesthacht G.m.b.H., Geesthacht-Tesperhude (Germany, F.R.). Inst. fuer Werkstofftechnologie und Chemie.
Uranium Production from the Sea. Considerations on the Layout of a Plant on the Basis of Fluidized Adsorber Beds with Active Water Transport (Pump Concept Alternative).
P. H. Koske, and K. Ohlrogge. 1981, 16p GKSS-81/E/9
In German.
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

This report deals with the extraction of uranium from sea water with active water transport by pumping systems. Because of the nearly negligible energy demand of the extraction process with pumped sea water, a concept with barges as adsorber carriers was developed. (ERA citation 07:042425)

DE82780447 PC **A03**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Material- und Festkoerperforschung.
Hafnium: Material for Chemical Apparatus Engineering.
D. Jennert. Jan 81, 47p KFK-3004, PWA-107/80
In German.
U.S. Sales Only.

This work describes the reported properties of hafnium in technical quality (DIN-material No. 2.6400) as material for chemical apparatus engineering. The occurrence, refining, physical and chemical properties are described as well as the material behavior. In conclusion, there is, at present, sufficient information for the development of hafnium. Investigations for special applications must be performed. (ERA citation 07:044167)

DE82902377 MF **A01**
Erlangen-Nuernberg Univ. (Germany, F.R.).
Investigations of Ternary and Quaternary Systems of Titanium for the Development of Technically Applicable Casting Alloys.
A. Seibold. 9 Nov 79, 123p NP-2902377
In German.Thesis.
U.S. Sales Only. Available in microfiche only.

The melting equilibria in different ternary and quaternary systems of alloys were investigated as well as the mechanical and casting properties out of the range of these systems as Ti-Al5-alloys with contents of transition metals and Ti-Al-Fe-alloys with spurious boron additions. The influence of the alloy composition on these properties were investigated. (ERA citation 07:044175)

N82-27382/2 PC **A13**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Materials Processing Lab.
The Materials Processing Research Base of the Materials Processing Center.
Annual Report for FY 1981.
M. C. Flemings. 28 Jun 82, 295p NASA-CR-169096, NAS 1.26:169096
Grant NSG-7645

No abstract available.

N82-27462/2 PC **A07**/MF **A01**
Michigan Technological Univ., Houghton. Dept. of Metallurgical Engineering.
Solute Transport During the Cyclic Oxidation of Ni-Cr-Al Alloys.
M.S. Thesis.
J. A. Nesbitt. May 82, 140p NASA-CR-165544, NAS 1.26:165544
Grant NSG-3215

Important requirements for protective coatings of Ni-Cr-Al alloys for gas turbine superalloys are resistance to oxidation accompanied by thermal cycling, resistance to thermal fatigue cracking. The resistance to oxidation accompanied by thermal cycling is discussed. The resistance to thermal fatigue cracking is also considered.

N82-27463/0 PC **A03**/MF **A01**
Tandem Accelerator Lab., Uppsala (Sweden).
Measurements of Nitrogen Depth Distribution in the Surface of Steel with the n-14(D,p sub O)N-15 Reaction.
R. Didriksson, L. Goenczi, and B. Sundqvist. 1980, 29p TLU-73-80

The (14)N(d,p0) (15)N nuclear reaction was used to measure the nitrogen depth distribution in the surface of steel samples. With a beam energy of 2.5 MeV, a depth of 15(SIGMA)m could be analyzed. The depth resolution was 0.7 (SIGMA)m (FWHM) and nitrogen contents down to 0.02 percent could be determined.

PAT-APPL-6-370 236 PC **A03**/MF **A01**
Department of the Air Force, Washington, DC.
High Performance Multifunctional Corrosion Inhibitors.
Patent Application,
Charles T. Lynch, and Fred W. Vahldiek. Filed 21 Apr 82, 35p AD-D009 568/7
Portions of this document are not fully legible.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This document describes a multifunctional corrosion inhibitor consisting essentially of an alkali metal borate, an alkali metal nitrate, an alkali metal nitrite, an alkali meta metasilicate, an alkali metal phosphate, mercaptobenzothiazole and at least one selected surfactant. (Author)

PAT-APPL-6-375 642 PC **A02**/MF **A01**
Department of the Air Force, Washington, DC.
A Quaternary Alloy and Method of Making and Using Same.
Patent Application,
Frank Z. Hawrylo. Filed 6 May 82, 16p AD-D009 557/0
Portions of this document are not fully legible.

Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A wide band gap semiconductor alloy having a combination of P, In, Te, and Zn is formed by liquid phase epitaxy on an InP substrate. This alloy can be used for the formation of p-n junctions. (Author)

PB82-253774 PC **A10**/MF **A01**
Cambridge Univ. (England). Dept. of Engineering.
Deformation-Mechanism Maps for Metals and Alloys.
Nov 81,
H. J. Frost, and M. F. Ashby. Nov 81, 220p CUED/C/MATS/TR-87
Also pub. in ISSN-0309-6505

The various mechanisms by which crystalline solids deform plastically were investigated and deformation-mechanism diagrams or maps showing the field of stress, temperature and strain-rate over which each mechanism is dominant were constructed for some 40 pure metals, alloys and ceramics. The maps were constructed from experimental data and fitted to model-based rate-equations which described the mechanisms. Further developments (including transient behavior, influence of pressure, behavior at very low and very high strain rates) and the problem of scaling laws were studied and the use of the maps demonstrated by a number of simple case studies. The materials investigated were divided into isomechanical groups to give information about materials not analyzed in the project. The described technique of constructing deformation-mechanism maps is applicable to other materials.

PB82-253790 PC **A14**/MF **A01**
Indian Inst. of Tech., Bombay.
Symposium on Surface Phenomena in Metallurgical Processes Held at Indian Institute of Technology, Bombay on Feberuary 19-20 1977.
Feb 77, 323p
Portions of this document are not fully legible.

The symposium was attended by a large number of delegates from educational, research and industrial organizations. Papers covering almost every aspect of surface phenomena in metallurgical processes were presented in six technical sessions. The proceedings contain the various papers presented in the technical sessions and the discussions. The topics covered are: Corrosion and Electrometallurgy; Process Metallurgy and Thermodynamics; Sintering and Phase Transformation; Flotation; and Experimental Techniques.

PB82-253857 PC **A06**/MF **A01**
Cambridge Univ. (England). Dept. of Engineering.
The Use of Compliance and Electrical Resistance Techniques to Characterise Fatigue Crack Closure.
Final rept.,
N. A. Fleck. Jan 82, 116p CUED/C/MATS/TR-89
Also pub. in ISSN-0309-6505.

The use of compliance and d.c. potential techniques for monitoring the closure response of BS4360 Grade 50B structural steel were investigated. The cyclic loads on 3mm thick compact tension specimens were shed manually to maintain a constant stress intensity range and load ratio. Compliance methods indicated the crack to be closed for 28 plus or minus 4% of the load range, with the crack closing right back to the notch at minimum load. The stress intensity at which the crack closed was independent of crack length and location of compliance gauge behind the crack tip, except for the near crack tip strain gauge. The manner in which the fatigue crack opened at loads between minimum load and the crack opening load was deduced from compliance measurements: the inferred behavior compared favorably with direct observations of crack opening response, using replication methods. Fatigue crack opened continuously from notch to crack tip, as the stress intensity was increased from the minimum to the opening value of the fatigue cycle. Residual displacement was measured using a crack tip clip gauge. Potential drop methods were unable to detect the degree and extent of crack closure.

PB82-253923 PC **A11**/MF **A01**
Indian Inst. of Tech., Bombay.
Symposium on Electro Slag and Other Special Refining Processes Held at Bombay on 31st August 1979.
Aug 79, 238p
Sponsored in part by Bharat Heavy Electricals Ltd., Bhopal (India).Portions of this document are not fully legible.

New and special refining processes have been invented and developed from time to time to meet the ever increasing demand for improved quality of metals and alloys. These include the consumable electrode remelting processes including electroslag remelting, vacuum and other ladle refining processes, powder injection, zone refining, electrotransport refining etc. Apart from their use in the production of highly sophisticated materials used in aerospace, nuclear and other specialized industries, many of these processes have also found wider application in the economic production of more common metals and alloys. Special mention may be made of the electroslag refining process, a highly specialized refining-cum-casting process, which produces metal of a very high quality at high yield. These proceedings contain eight papers on electroslag refining and five on other special refining processes.

PB82-253931 PC **A06**/MF **A01**
Indian Inst. of Tech., Bombay.
Powder Metallurgy Alloys: Proceedings of the Symposium Held at I.I.T. Bombay on October 11, 1980.
c1982, 122p

Powder Metallurgy is a rapidly growing manufacturing process for forming precision components and shapes from metal powders. The powder metallurgy technology is expanding into more demanding application and has led to the development of a variety of powder metallurgy alloys which are unusual to conventional metallurgy ranging from ferrous and non-ferrous alloys for structural components, cemented carbides, electrical contacts, high temperature alloys and in fields demanding great resistance to material deterioration. Selected papers presented in the symposium are incorporated in this book and cover such important areas such as powder production, mixing of powders, high energy rate forming, sintering, alloying, cemented carbides, magnetic materials and super alloys. The report on the panel discussions will provide the status of powder metallurgy in India and directions for future activities. The book contains 10 sections making it extremely useful as a necessary addition to any Materials Engineering, Manufacturing/Production Engineering, Metallurgy, Ceramics, Powder Technology and Powder Metallurgy Library.

PB82-873480 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Gold Metallography. 1970-August, 1982 (Citations from the Engineering Index Data Base).
Rept. for 1970-Aug 82.
Aug 82, 179p

This bibliography contains citations concerning metallography of gold. Techniques used in the studies include X-Ray and optical diffraction, electron microscopes, and acoustic techniques. The examinations included diffusion, grain growth and size, phase transitions and microstructure of gold alloys. The studies include the influence of the metallographic properties to physical properties, such as resistivity, electrodeposition boundaries, low alloy tarnish, working characteristics, and age hardening. (Contains 201 citations fully indexed and including a title list.)

PB82-873670 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Sulfuric Acid Anodizing of Aluminum and Aluminum Alloys. 1966-August, 1982 (Citations from the Metals Abstracts Data Base).
Rept. for 1966-Aug 82.
Aug 82, 79p
Supersedes PB81-881153.

This bibliography contains citations concerning the anodization of aluminum utilizing sulfuric acid. Oxide film quality and the resulting corrosion protection is discussed. Resistance of the coating to abrasion, the hardness of the oxide film, and the minimization of pitting corrosion is also presented. (This updated bibliography contains 127 citations, 20 of which are new entries to the previous edition.)

PB82-873753 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Corrosion Protection of Aluminum and Aluminum Alloys. 1973-August, 1982 (Citations from Information Services in Mechanical Engineering Data Base).
Rept. for 1973-Aug 82.
Aug 82, 97p
Supersedes PB81-880379.Prepared in cooperation with Cambridge Scientific Abstracts, Washington, DC.

This bibliography contains citations concerning corrosion protection of aluminum and aluminum alloys. Atmospheric corrosion and the use of corrosion inhibitors and electrochemical passivation techniques are presented. Performance evaluations of various coating systems for aluminum are also included. (This updated bibliography contains 114 citations, 19 of which are new entries to the previous edition.)

PB82-873787 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Induction Furnaces. 1976-August, 1982 (Citations from the Energy Data Base).
Rept. for 1976-Aug 82.
Aug 82, 111p
Supersedes PB82-854753.Prepared in cooperation with the Department of Energy, Washington, DC.

This bibliography contains citations concerning the melting of metals by electromagnetic induction. Topics include furnace operaions, furnace and crucible refractories, installations, design engineering, stirring, steel making, and melting kinetics. Coreless, channal, vacuum, and high and low frequency furnaces are discussed. (This updated bibliography contains 109 citations, 16 of which are new entries to the previous edition.)

PB82-873829 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Stress Corrosion of Stainless Steel. 1976-August, 1982 (Citations from the International Information Service for the Physics and Engineering Communities Data Base).
Rept. for 1976-Aug 82.
Aug 82, 165p

This bibliography contains citations concerning stainless steel stress corrosion. Stress corrosion cracking and fatigue, the mechanics of cracking and fatigue, and test methods to study crack inition and fracture are discussed. The effects of high salt concentration solutions and temperature on stress corrosion are also considered. Stainless steel corrosion in nuclear power facilities is discussed. (Contains 134 citations fully indexed and including a title list.)

11G. Miscellaneous Materials

N82-27494/5 PC **A04**/MF **A01**
Martin Marietta Aerospace, Denver, CO. Denver Div.
Evaluation and Prediction of Long-Term Environmental Effects on Nonmetallic Materials.
Final Report.
May 82, 61p NASA-CR-162043, NAS 1.26:162043
Contract NAS8-33578

Changes in functional properties of a broad spectrum of nonmetallic materials as a function of environment and exposure time were evaluated. Models for predicting long-term material performance are discussed. A literature search on specific materials in the space and simulated space environment was carried out and evaluated.

11H. Oils, Lubricants, and Hydraulic Fluids

AD-A117 458/0 PC **A02**/MF **A01**
Northwestern Univ., Evanston, IL. Dept. of Mechanical and Nuclear Engineering.
Mechanics of Surface Damage in Elastohydrodynamic Contacts.
Final rept.,

Herbert S. Cheng, and Leon M. Keer. 1 Jun 82, 23p
ARO-16005.3-EG
Grant DAAG29-78-G-0199

The first part of the grant was devoted to nearly pure rolling contacts and deals with an analysis of the rate of growth of a surface or a subsurface crack in a two-dimensional Hertzian contact with or without tangential force on the surface. This analysis is expected to be used as the basis on which a life prediction model can be formulated. Further analysis developed closed form solutions for problems of three-dimensional contact. Explicit expressions in closed form were developed for the subsurface stress field for normal and sliding elliptical contact. The second part of the grant was intended for contacts having a high slide to roll ratio. These contacts usually fail by an accelerated adhesive wear process commonly known as scuffing such as that occurring at the root or tip of gear teeth. Even through the detailed mechanisms of scuffing are yet to be uncovered, there are strong evidences indicating that scuffing failure is of a thermal origin. For this reason, the major part of the second part is focused on a detailed transient analysis of the growth of surface temperature at the asperity tips between two rough sliding EHL contacts.

AD-A117 496/0 PC **A03**/MF **A01**
Computer Sciences Corp., NSTL Station, MS. Engineering Lab.
Feasibility Study: Hollow Plastic Spheres to Increase Hydraulic Fluid Compressibility.
Final rept.,
J. Kotter, B. B. Saunders, J. H. Walker, and M. J. Wood. Jul 82, 46p ARLCD-CR-82033, SBI-AD-E400 867
Contract NAS13-50
Project engineer: R. Dombroski.

This report documents a study on the feasibility of using sub-micron size hollow plastic spheres as an energy absorbing medium in the fluid of a compressible fluid recoil mechanism for field artillery. The study identifies the properties of a polymer which theoretically will increase the compressibility of a recoil fluid. (Author)

AD-A117 702/1 PC **A04**/MF **A01**
Battelle Columbus Labs., OH.
Thermal Effects in Rolling/Sliding Contact.
Final rept. 1 Jun 81-31 May 82,
T. A. Dow, R. D. Stockwell, T. L. Merriman, and J. W. Kannel. 31 Jul 82, 59p Rept no. BATT-G-7818-0001
Contract N00014-81-C-0608

This report discusses the results of a series of pressure and temperature distributions measured between a pair of elastohydrodynamically (EHD) lubricated disks. Three lubricants have been studied: a synthetic paraffinic oil (XRM-109F), polyphenyl ether (OS-124), and a traction fluid (Santotrac 50). Pressure and temperature readings throughout the contact are presented as three-dimensional plots. Measurements of the EHD film thickness, and the tractive force between disks under slip conditions are also presented. A method for one-dimensional mapping of tractive force is introduced. An instrumental part of the method is the data handling capability of a digitizing oscilliscope which captures signals from the traction probe. The oscilliscope's capabilities are greatly expanded by a microprocessor which controls its functions. Preliminary results from this method of local traction measurement are presented. (Author)

DE82009655 PC **A02**/MF **A01**
Oak Ridge Y-12 Plant, TN.
Cutting-Fluid Conservation.
K. O. Pearson. Mar 82, 18p Y-2250
Contract W-7405-ENG-26

To reduce costs and meet environmental standards, a water-soluble oil was tested and found to be satisfactory for multimachining operations performed on a variety of materials such as stainless steel, copper, aluminum, and many types of steel. In addition, a closed-loop cutting-fluid reclamation system was designed, fabricated, and installed in the Oak Ridge Y-12 Plant's General Machine Shop. A cost savings in excess of $90,000 was achieved in the first year following the introduction of the new cutting fluid and installation of the new reclamation system. An estimated annual savings of $48,000 is anticipated because disposal of the previously used cutting fluids has been eliminated. (ERA citation 07:047652)

PB82-872698 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Rod Seals: Interaction With Hydraulic Fluids. 1973-August, 1982 (Citations from the BHRA Fluid Engineering Data Base).
Rept. for 1973-Aug 82.
Aug 82, 90p
Supersedes PB81-869455.

on and piston rod
seals in terms of both wear resistance and the reactions of hydraulic fluids with elastomeric sealing compounds. Topics include temperature effects on seal wear, thermal degradation of seal materials, and effects of contaminants on hydraulic fluid degradation. (This updated bibliography contains 84 citations, 29 of which are new entries to the previous edition.)

PB82-873423 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Lubricants and Greases: Evaluation Test Methods. 1973-August, 1982 (Citations from the BHRA Fluid Engineering Data Base).
Rept. for 1973-Aug 82.
Aug 82, 147p
Supersedes PB81-881757.

This bibliography contains citations concerning testing methods for the evaluation of the lubricating properties of greases. Additives such as molybdenum disulfide are discussed. Lubrication effects on material fatigue, service life, and wear are included. (This updated bibliography contains 149 citations, 37 of which are new entries to the previous edition.)

11I. Plastics

AD-A117 388/9 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC. National Measurement Lab.
Method of Evaluating the Thermal Stability of the Pyroelectric Properties of Polyvinylidene Fluoride Effects of Poling Temperature and Field.
Technical rept.,
Danilo DeRossi, A. S. DeReggi, M. G. Broadhurst, S. Roth, and G. T. Davis. Jun 82, 32p Rept no. TR-18
Contract N00014-79-F-0012

The ac pyroelectric response of a number of differently poled polyvinylidene fluoride films has been measured while the temperature was varied at a constant rate of about 5 C/min. from room temperature to near the melting temperature. The response first increases with increasing temperature which is attributed to an increase of the thermal expansion coefficient and eventually decreases due to melting and/or loss of electric dipole orientation. The details of the temperature dependence are influenced in a reproducible manner by the poling variables especially the poling temperature. The measurement is therefore proposed as a way of evaluating the effect of processing variables on the thermal stability of the piezo and pyroelectric properties. (Author)

AD-A117 416/8 PC **A03**/MF **A01**
Case Western Reserve Univ., Cleveland, OH. Ultrasonics Research Lab.
Compressibility of Colloids: I. Compressibility Studies of Aqueous Solutions of Amphiphilic Polymers and Their Adsorbed State on Polystyrne Latex Dispersions by Ultrasonic Velocity Measurements.
Technical rept.,
M. A. Barrett-Gueltepe, M. E. Gueltepe, and E. B. Yeager. 1 Jun 82, 33p Rept no. TR-49
Contract N00014-75-C-0557

Sound velocity measurements were made to obtain compressibility values at 2 MHz, and to investigate the influence of the interface in dispersions of electrostatically stablized dispersions. The measurements were on aqueous dispersions of polystyrene latex as a function of volume concentration up to 49% and temperature up to 80 C (approaching the glass transition temperature), and in solutions of 72.5%, and 78% hydrolyzed polyvinyl alcohol-polyvinyl acetate block copolymers (PVA) as a function of temperature above and below their cloud points. The measurements were extended to latex coated with PVA under conditions known to give a 30 nm layer at room temperature. These dispersions give a resultant compressibility lower than expected from the simple additive effect of the separate components at 25 C and higher. The decrease in compressibility may be due to either or both of two effects: the hydrophobic interaction between the acetate groups and the polymer backbone of the polystyrene latex results in a more rigid structure, and the suppression by the PVA coating of the association-dissociation reaction responsible for the remarkable high adsorption of ultrasound will result in a lower compressibility. (Author)

AD-A117 781/5 PC **A02**/MF **A01**
Rutgers - The State Univ., New Brunswick, NJ. Dept. of Mathematics.
Monte-Carlo Studies of a Polymer between Planes, Crossover between Dimensionalities,
I. Webman, J. L. Lebowitz, and M. H. Kalos. 16 Nov 79, 7p AFOSR-TR-82-0600
Contract DOE-EY-76-C-02-3077, Grant AFOSR-78-3522
Pub. in Jnl. of Physique, v41 p579-583 Jun 80.

No abstract available.

AD-A117 786/4 PC **A02**/MF **A01**
Rutgers - The State Univ., New Brunswick, NJ. Dept. of Mathematics.
A Monte Carlo Study of the Collapse of a Polymer Chain,
I. Webman, Joel L. Lebowitz, and M. H. Kalos. 16 Dec 80, 9p AFOSR-TR-82-0606
Contract DE-AC02-76ER03077, Grant AFOSR-78-3522
Pub. in Macromolecules, v14 n5 p1495-1501 Sep-Oct 81.

No abstract available.

AD-A117 788/0 PC **A02**/MF **A01**
Rutgers - The State Univ., New Brunswick, NJ. Dept. of Mathematics.
Computer Simulation of the Static and Dynamic Properties of a Polymer Chain,
David Ceperley, and Joel L. Lebowitz. 16 Dec 80, 10p AFOSR-TR-82-0595
Grant AFOSR-78-3522
Pub. in Macromolecules, v14 n5 p1472-1479 Sep-Oct 81.

No abstract available.

AD-A117 790/6 PC **A02**/MF **A01**
Rutgers - The State Univ., New Brunswick, NJ. Dept. of Mathematics.
Properties of Two-Dimensional Polymers,
Jan Tobochnik, Itzhak Webman, Joel L. Lebowitz, and M. H. Kalos. 3 Aug 81, 7p AFOSR-TR-82-0609
Contract DE-AC02-76ER03077, Grant AFOSR-78-3522
Pub. in Macromolecules, v15 n2 p549-553 Mar-Apr 82.

No abstract available.

AD-A117 853/2 PC **A04**/MF **A01**
Hughes Helicopters, Inc., Culver City, CA.
Development of Effective Machining and Tooling Techniques for Kevlar Composite Laminates.
Final rept. Feb-Dec 81,
Rod Doerr, Ed Greene, B. Lyon, and Saad Taha. Jun 82, 56p HHI-81-462, USAAVRADCOM-TR-82-D-4
Contract DAAK51-81-C-0008

This report contains the results of the work performed for the development of the Kevlar laminate machining techniques program. The results include information assisting in the drilling, cutting and trimming of Kevlar/epoxy and Kevlar/polysulfone cured laminates. The program was in three phases. Phase I consisted of a technology survey and a tool vendors/developers survey. Fifty-one technical documents were reviewed and eight vendors/developers were visited. (Author)

AD-A117 942/3 PC **A02**/MF **A01**
Oklahoma Univ., Norman. School of Aerospace, Mechanical and Nuclear Engineering.
Mechanics of Bimodular Composite Structures.
Technical rept.,
C. W. Bert, and J. N. Reddy. Jul 82, 19p Rept nos. OU-AMNE-82-4, TR-28
Contract N00014-78-C-0647

Prepared in cooperation with Virginia Polytechnic Institute and State University, Blacksburg, VA 24061. Dept. of Engineering Science and Mechanics. Rept. VPI-E-82.20

This report is a survey of the mechanics of beam and plate structures laminated of fiber-reinforced composite materials having different elastic and thermoelastic properties in tension and compression. Examples of such materials include tire cord-rubber, wire-reinforced solid propellants, and soft biological materials. Specific topics covered include: mathematical models of fiber-reinforced bimodular materials and their experimental verification; static and dynamic analysis of laminated and sandwich beams; plane elasticity; analysis of deflection and free and transient vibration of laminated plates and shells. In all of these analyses, thickness-shear deformation and rotatory inertia are included. The solution methods used include closed-form, transfer-matrix, and finite-element techniques. (Author)

DE82010112 MF **A01**
Bendix Corp., Kansas City, MO.
Polystyrene-Bead Foam for Electronic Packages.
D. J. Fossey, and C. H. Smith, Jr. Oct 81, 13p BDX-613-2710, CONF-820505-1
Contract AC04-76DP00613
Society of Plastics Engineers annual technical conference, San Francisco, CA, USA, 10 May 1982, Portions of this report are illegible.
Best available copy from document source. Available in microfiche only.

Two different types of materials were considered as candidates for removable encapsulants; one was a thermoplastic polyurethane foam. Experimental work had shown this type of polyurethane foam could be formulated with all of the desired properties except temperature resistance. Work is continuing on the development of a solvent-removable polyurethane foam with higher temperature capability. The second material considered was polystyrene bead foam (PSBF), which is easily processed in the required density range and can be removed readily by common solvents. The polystyrene beads can be preexpanded and screened to the desired density in standard preexpansion equipment, and then poured into the free or void space of the unit. The unit is sealed and subjected to a fusion cycle in an oven at 100 exp 0 C. Bendix has undertaken an extensive evaluation of PSBF for this application.

DE82012868 PC **A02**/MF **A01**
General Electric Co., St. Petersburg, FL. Neutron Devices Dept.
Aging of Adiprene/Butanediol/Trimethylolpropane Stocks.
K. E. Creed, Jr. 16 Apr 82, 25p GEPP-TIS-649
Contract AC04-76DP00656

Neutron tubes and generators built at the General Electric Neutron Devices Department (GEND) are encapsulated in a polymer system for insulation and protection of parts against environmental factors. One of the encapsulating materials is Adiprene/1,4-butanediol/1,1,1-trimethylolpropane. A silane adhesion promoter is added to this system to promote adhesion of the encapsulant. In this study, the effect of temperature (40, 60 and 80 exp 0 C) and humidity aging (20, 50 and 80% relative humidity) on the physical characteristics of the Adiprene stocks both with and without silane were studied. Parameters such as tensile strength, elongation, modulus, shear modulus and hardness were measured over a 24-week period. Significant changes in properties were noted at 80 exp 0 C under all conditions and at all temperatures at 80% relative humidity. (ERA citation 07:044216)

N82-27495/2 PC **A02**/MF **A01**
Texas A and M Univ., College Station. Plastics Engineering Lab.
Capillary Rheometry for Thermosets.
S. C. Malguarnera, and D. R. Carroll. 1982, 16p
NASA-CR-169122, NAS 1.26:169122
Sponsored by NASA.

Capillary rheometry is effectively used with thermosets. Most important is providing a uniform temperature in the barrel. This was successfully accomplished by using a circulating hot oil system. Standard capillary rheometry methods provide the dependence of thermoset apparent viscosity on shear rate, temperature and time. Such information is very useful in evaluating resin processability and in setting preliminary fabrication conditions.

PB82-873308 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Polymer Processing for Boats and Rafts. 1973-August, 1982 (Citations from the Rubber and Plastics Research Association Data Base).
Rept. for 1973-Aug 82.
Aug 82, 135p
Supersedes PB81-881476.

This bibliobraphy contains citations concerning plastic boat manufacturing processes, which include rotational molding, hand lay-up, spray-up, vacuum injection molding, resin injection molding, liquid injection molding, foam reservoir molding and thermoforming. A variety of boats and accessories are discussed with reference to their manufacture utilizing such polymers as fiber reinforced polyester, polyurethane foam, epoxy resin, nylon, acetal resin, ABS, polyethylene, styrene, butyl rubber and light weight polypropylene. Discussions of mechanical properties of polymeric materials for boat building are included, as well as market trend forecasts. (This updated bibliography contains 168 citations, 37 of which are new entries to the previous edition.)

PB82-873373 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Glass Fiber Reinforced Plastics: Fracture Mechanics. 1975-August, 1982 (Citations from the International Information Service for the Physics and Engineering Communities Data Base).
Rept. for 1975-Aug 82.
Aug 82, 135p

This bibliography contains citations concerning fiber fatigue and fracture mechanics of glass fiber reinforced plastics. The effects of fiber orientation, time, temperature and load rate on fracture mechanics are examined. Methods for studying fatigue are also discussed. (Contains 115 citations fully indexed and including a title list.)

11J. Rubbers

PB82-252545 PC **A03**/MF **A01**
Cambridge Univ. (England). Dept. of Engineering.
A Model for the Toughness of Epoxy-Rubber Particulate Composite.
Final rept.,
S. Kunz-Douglas, P. W. R. Beaumont, and M. F. Ashby. 1980, 45p CUED/C/MATS/TR-65-1980
Also pub. in ISSN-0309-6505.

Epoxy resins are toughened significantly by a dispersion of rubber precipitates. Microscopic examinations of propagating cracks in epoxy-rubber composites reveal that the brittle epoxy matrix cracks, leaving ligaments of rubber attached to the two crack surfaces. The rubber particles are stretched as the crack opens and fail by tearing at large, critical extensions. This fracture mechanism is the basis of a new analytical model for toughening. An increase in toughness of the composite is identified with the amount of elastic energy stored in the rubber during stretching which is dissipated irreversibly (e.g. as heat) when the particles fail. The model predicts the failure strain of the particles in terms of their size. It also relates the toughness increase to the volume fraction and tearing energy of the rubber particles. Direct measurements of the tearing strains of rubber particles, and toughness data obtained from epoxy-rubber composites, are in good agreement with the model. The particle-stretching model provides a quantitative explanation, in contribution to existing qualitative theories, for the toughening of epoxy-rubber composites.

11K. Solvents, Cleaners, and Abrasives

PB82-873456 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Plastics: Lubricants used in Extruding and Molding. 1973-August, 1982 (Citations from the Rubber and Plastics Research Association Data Base).
Rept. for 1973-Aug 82.
Aug 82, 154p
Supersedes PB81-880908.

This bibliography contains citations concerning technological research and development of external and internal lubricants for plastics molding processes. Among the lubricants discussed are polypropylene and polyethylene glycols, PTFE, silicones, salts and amides of fatty acids, olefin hydrocarbon waxes and fat-based materials. Performance evaluation relative to various molding operations are also considered. (This updated bibliography contains 169 citations, 45 of which are new entries to the previous edition.)

11L. Wood and Paper Products

DE82009156 MF **A01**
Maine Univ. at Orono.
Wet Pressing Project. Progress Report, October 1980-December 1981.
W. H. Ceckler. 25 Jan 82, 169p DOE/CS/40064-2
Contract AS02-78CS40064
Portions Of Document Are Illegible.
Best available copy from document source. Available in microfiche only.

This report summarizes the progress on the UMO Wet Pressing project for the period October 1980 through December 1981. The most significant findings are that there are three regimes of pressing: flow control, intermediate, and compression control, and that optimal pressing strategy is different in each regime. In compression control a hard nip is desirable, in intermediate a soft nip is desirable, and in flow control it doesn't matter.

PB82-811340 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Particle Boards: Fabrication, Use, and Properties. 1970-August, 1982 (Citations from the Engineering Index Data Base).
Sep 82, 304p
Supersedes PB81-806911 and PB80-807613.

The bibliography cites worldwide engineering research on particle boards. Their fabrication, use in construction, and properties are included. Methods of measurement, cutting, testing for quality, and economic return are discussed. (This updated bibliography contains 295 citations, 17 of which are new entries to the previous edition.)

PB82-811357 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Fiberboards: Fabrication, Use, and Properties. 1977-August, 1982 (Citations from the Engineering Index Data Base).
Sep 82, 149p
Supersedes PB81-806929 and PB80-807621.

The bibliography cites worldwide engineering research on fiberboards. Fabrication methods, use in construction, and properties are included. Methods of measurement and testing for quality and improved economic return are included relative to paper boards, boxboards, pressboards, linerboards, and wallboards. (This updated bibliography contains 140 citations, 5 of which are new entries to the previous edition.)

PB82-873597 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Paper Product Manufacturing: Polymeric Additives and Rheology. 1972-August, 1982 (Citations from the Institute of Paper Chemistry Data Base).
Rept. for 1972-Aug 82.
Aug 82, 120p
Supersedes PB81-880643.

This bibliography contains citations concerning the effect that polymers in paper and board binders, coatings, pulps, pigments, fillers, adhesives and synthetic fibers have on rheological behavior. Drag coefficients are investigated and results are discussed relative to

mixed polymer-fiber systems. Rheological reports are presented for a variety of papers, fiberboard, pressboard, particleboard and corrugated board. Airknife, coextrusion, champion, size-press and trailing-blade coating techniques are discussed with reference to rheological characteristics. (This updated bibliography contains 84 citations, 10 of which are new entries to the previous edition.)

12.

MATHEMATICAL SCIENCES

AD-A117 914/2 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Research Lab. of Electronics.
Finite Ensemble Averages of Zero-Temperature Resistance and Conductance of Disordered One-Dimensional Systems,
A. D. Hone, and J. D. Joannopoulos. 22 Sep 81, 6p
Contract N00014-77-C-0132
Pub. in Physical Review B, v25 n4 p2400-2404 1982.

No abstract available.

12A. Mathematics and Statistics

AD-A117 378/0 PC **A04**/MF **A01**
Illinois Univ. at Urbana-Champaign. Computer-Based Education Research Lab.
Standardized Extended Caution Indices and Comparisons of their Rule Detection Rates.
Research rept.,
Kikumi K. Tatsuoka, and Maurice M. Tatsuoka. Mar 82, 63p Rept no. CERL-RR-82-4-ONR
Contract N00014-79-C-0752

Several extended caution indices (ECIs) have been introduced earlier as a link between two distinctly different approaches: One based on the standard statistics and the other, a model-based approach utilizing item response theory (IRT). Expected values and variances of some ECIs are derived and their statistical properties are compared and discussed. Then, standardized ECIs are introduced and their distributions are investigated. It turns out that the standardized ECIs fit normal distributions well. A comparison of detection rates among appropriateness measures based on IRT theory is carried out with the signed-number dataset. There is no noticeable difference in their detection rates using the 80% intervals.

AD-A117 390/5 PC **A03**/MF **A01**
Brown Univ., Providence, RI. Lefschetz Center for Dynamical Systems.
Perturbation of Homoclinics and Subharmonics in Duffing's Equation.
Technical rept.,
Jack K. Hale, and A. Spezamiglio. Mar 82, 30p
LCDS-82-3, AFOSR-TR-82-0558
Grant AFOSR-81-0198

For (lambda, mu) and (g,f) small, the equation x - x + 2x cubed + g(x) = - lambda x + mu(cos t + f(t))is considered near the separatrix S of the unperturbed equation (lambda, mu) = (0,0). For (g,f) in a neighborhood of the zero functions, a complete description is given of the bifurcation curves in (lambda, mu) - space to homoclinic points. The perturbation of subharmonics outside S is also considered in a symmetric and nonsymmetric case.

AD-A117 460/6 PC **A02**/MF **A01**
Texas A and M Univ., College Station. Inst. of Statistics.
Quantiles, Parametric-Select Density Estimations, and Bi-Information Parameter Estimators.
Technical rept.,
Emanuel Parzen. Jun 82, 25p TR-B-6, ARO-16992.12-MA
Contract DAAG29-80-C-0070

This paper outlines a quantile-based approach to functional inference problems in which the parameters to be estimated are density functions. Exponential models and autoregressive models are approximating densities which can be justified as maximum entropy for respectively the entropy of a probability density and the entropy of a quantile density. It is proposed that bi-information estimation of a density function can be developed by analogy to the problem of identification of regression models. (Author)

AD-A117 493/7 PC **A03**/MF **A01**
Duke Univ., Durham, NC. Dept. of Computer Sciences.
Performance Bounds for Binary Testing with Arbitrary Weights.
Technical rept.,
Donald W. Loveland. Mar 82, 43p CS-1982-4, AFOSR-TR-82-0557
Grant AFOSR-81-0221

Binary testing concerns finding good algorithms to solve the class of binary identification problems. A binary identification problem has as input a set of objects, including one marked as distinguished (e.g., faulty), for each object an a priori estimate that it is the distinguished object, and a set of tests. Output is a testing procedure to isolate the distinguished object. One seeks minimal cost testing procedures where cost is the average cost of isolation, summed over all objects. This is a problem schema for the diagnosis problem: applications occur in medicine, systematic biology, machine fault location, quality control and elsewhere. In this paper we extend work of Garey and Graham to assess the capability of fast approximation rule, the binary splitting rule, to give near optimal testing procedures when the a priori estimates are arbitrary. We find conditions on the test set such that approximation error reduces nearly to, that of the equally likely a priori estimate case of Garey and Graham and find another upper bound on approximation error for the same test set condition which works very well under a priori estimate assumptions where the first results is poor. (Author)

AD-A117 513/2 PC **A03**/MF **A01**
Florida State Univ., Tallahassee. Dept. of Statistics.
Large Deviation Local Limit Theorems for Arbitrary Sequences of Random Variables.
Technical rept.,
Narasinga Rao Chaganty, and J. Sethuraman. Jun 82, 39p FSU-STATISTICS-M630, TR-D-53, ARO-16713.19-MA
Contract DAAG29-79-C-0158

The results of W. Richter (Theory Prob. Appl. (1957) 2 206-219) on sums of independent, identically distributed random variables are generalized to arbitrary sequences of random variables Tn. Under simple conditions on the cumulant generating function of Tn, which imply that Tau n/n converges to o, it is shown, for arbitrary sequences (mn) converging to o, that kn(mn), the probability density function of Tn/n at mn, is asymptotic to an expression involving the large deviation rate of Tn/n. Analogous results for lattice random variables are also given. Applications of these results to statistics appearing in nonparametric inference are presented. (Author)

AD-A117 514/0 PC **A03**/MF **A01**
Princeton Univ., NJ. Dept. of Statistics.
The Theory of Concentrated Fisher-Von Mises Distributions.
Technical rept.,
Geoffrey S. Watson. Sep 81, 28p Rept no. TR-205-SER-2
Contract N00014-79-C-0322

The density of the Fisher-von-Mises distribution is proportional to exp kappa micron prime x where x and the modal vector microns are unit vectors in IR(q) times kappa (equal to or greater than 0) is called the concentration parameter. The distribution of statistics for testing hypotheses about the modal vectors of m distributions simplify greatly as the concentration parameters tend to infinity. The non-null distributions are obtained for statistics appropriate when kappa 1,..., kappa m are known but tend to infinity and are unknown but equal to kappa which tends to infinity.

AD-A117 515/7 PC **A03**/MF **A01**
Princeton Univ., NJ. Dept. of Statistics.
Large Sample Theory of the Fisher-Von Mises Distribution.
Technical rept.,
Geoffrey S. Watson. Sep 81, 34p Rept no. TR-203-SER-2
Contract N00014-79-C-0322

The Fisher-von-Mises distribution has probability density proportional to exp kappa micron prime x where x and microns are points on the surface of the unit ball in q dimensions. Kappa greater than or equal to 0 is a concentration parameter and micron the 'mean' or modal direction. This paper makes a self-contained study of estimation and testing problems when the sample sizes are large. Earlier work used approximations based on eta finite and kappa large. Some of these results are shown to be true for all kappa if eta yields infinity. New tests are given by comparing the kappa's and the micron's of different populations; the latter tests do not assume that all populations have the same kappa's. Further, power functions are given for the proposed tests. Because the random vectors are of unit length we may expect these asymptotic distributions to be accurate approximations even with quite small sample sizes. (Author)

AD-A117 516/5 PC **A03**/MF **A01**
Princeton Univ., NJ. Dept. of Statistics.
Logarithmic Derivatives of Two Normalizing Functions.
Technical rept.,
Geoffrey S. Watson. Sep 81, 28p Rept no. TR-204-SER-2
Contract N00014-79-C-0322

No abstract available.

AD-A117 556/1 Not available NTIS
Association for Physical and Systems Mathematics, Inc., Franconia, NH.
Fiber Spaces, Connections and Yang-Mills Fields,
Robert Hermann. 1982, 46p ARO-16876.21-MA
Contract DAAG29-80-C-0031, Grant NSF-MCS80-03227
Availability: Pub. in Lecture Notes in Mathematics, n.d. (No copies furnished by DTIC/NTIS).
Availability: Microfiche copies only.

No abstract available.

AD-A117 576/9 Not available NTIS
North Carolina Univ. at Chapel Hill.
On the Local Convergence of Quasi-Newton Methods for Constrained Optimization,
Paul T. Boggs, Jon W. Tolle, and Pyng Wang. 6 Feb 80, 12p ARO-15157.7-MA
Grant DAAG29-77-G-0125
Availability: Pub. in SIAM Jnl. of Control and Optimization, v20 n2 p161-171 Mar 82 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A117 591/8 Not available NTIS
Wisconsin Univ.-Madison.
On Limits of Multivariate B-Splines,
Wolfgang Dahmen, and Charles A. Micchelli. 6 Feb 81, 24p ARO-16415.33-MA
Contract DAAG29-80-C-0041
Availability: Pub. in Jnl. D'Analyse Mathematique, v39 p256-278 1981 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A117 611/4 PC **A02**/MF **A01**
Naval Postgraduate School, Monterey, CA.
NOMBAS - A Bayesian Procedure for Selecting the Greatest Mean.
Technical rept.,
Alan R. Washburn. Jun 82, 24p Rept no. NPS55-82-017

NOMBAS is an acronym for NOrmal Myopic Bayes Sequential, and is the name of a Bayesian procedure for selecting the category with the greatest mean. This paper describes NOMBAS in detail and then compares it with other procedures on the basis of Bayes risk versus average sample number. (Author)

AD-A117 617/1 Not available NTIS
Columbia Univ., New York. Dept. of Mathematics.
On the Initial Value Problem for a Nonlinear Schrodinger Equation,
Guang-Chang Dong, and Shujie Li. 1981, 14p ARO-16415.39-MA
Contract DAAG29-80-C-0041

Availability: Pub. in Jnl. of Differential Equations, v42 n3 p353-365 Dec 81 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A117 618/9 Not available NTIS
Wisconsin Univ.-Madison. Dept. of Statistics.
Estimation of Variance of the Ratio Estimator,
Chien-Fu Wu. 1982, 8p ARO-16415.158-MA
Contract DAAG29-80-C-0041
Availability: Pub. in Biometrika, v69 n1 p183-189 1982 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A117 620/5 Not available NTIS
Wisconsin Univ.-Madison.
A Mathematical Model for Linear Elastic Systems with Structural Damping,
G. Chen, and D. L. Russell. 14 Aug 80, 23p ARO-16415.296-MA
Contracts DAAG29-80-C-0041, DAAG29-75-C-0024
Availability: Pub. in Quarterly of Applied Mathematics, p433-454 Jan 82 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A117 633/8 Not available NTIS
Wisconsin Univ.-Madison.
An Inhomogeneous Quasilinear Hyperbolic System,
Wany Ching-hua. 13 Jul 81, 20p ARO-16415.50-MA
Contract DAAG29-80-C-0041
Availability: Pub. in Acta Mathematica Scientia, v1 n3-4 p403-421 1981 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A117 718/7 PC **A04**/MF **A01**
Construction Engineering Research Lab. (Army), Champaign, IL.
Spectral Equivalence of Deterministic and Stochastic Models for Time Series with a Periodic Component.
Technical manuscript,
Michael John O'Connor. May 82, 75p Rept no. CERL-TM-P-130

Time series encountered in engineering applications typically contain strongly periodic behavior because of the dynamics of the underlying physical system. Several different approaches are being used to model this type of time series. However, in the time series literature there is little agreement about the appropriateness of alternative models. (Author)

AD-A117 726/0 PC **A02**/MF **A01**
Rutgers - The State Univ., New Brunswick, NJ. Dept. of Mathematics.
Free Energy and Correlation Functions of Coulomb Systems,
Joel L. Lebowitz. 1981, 19p AFOSR-TR-82-0608
Grant AFOSR-78-3522
Pub. in NATO Advanced Study Institutes Series, Series B: Physics, v74 p467-487.

No abstract available.

AD-A117 728/6 PC **A03**/MF **A01**
Brown Univ., Providence, RI. Lefschetz Center for Dynamical Systems.
Practical Methods for the Compensation and Control of Multivariable Systems.
Final rept. 1 Jan 77-31 Dec 81,
William A. Wolovich, and Peter L. Falb. Apr 82, 28p
AFOSR-TR-82-0583
Grant AFOSR-77-3182

The primary objective of this research has been the development of practical methods for the compensation and control of multivariable systems in order to facilitate the design of controllers for complex Air Force systems. A variety of different approaches were employed to accomplish this objective. In particular, the authors were most successful in developing new parameter adaptive control schemes for linear multivariable systems. One of the design algorithms employs an adaptive Luenberger observer which automatically adjusts the poles of a given system. It is felt that such an adaptive controller could be used in a variety of aerospace applications.

AD-A117 758/3 PC **A02**/MF **A01**
California Univ., Santa Barbara.
Inverse Elementary Divisor Problem for Doubly Stochastic Matrices.
Technical rept.,
Henryk Minc. 20 Oct 80, 12p AFOSR-TR-82-0573
Grant AFOSR-79-0127
Pub. in Linear and Multilinear Algebra, v11 p121-131 1982.

No abstract available.

AD-A117 769/0 PC **A02**/MF **A01**
California Univ., Santa Barbara. Inst. for the Interdisciplinary Applications of Algebra and Combinatorics.
Three Elementary Proofs of the Goldberg-Straus Theorem on Numerical Radii.
Technical rept.,
Marvin Marcus, and Markus Sandy. 1 Apr 81, 11p
AFOSR-TR-82-0574
Grant AFOSR-79-0127
Pub. in Linear and Multilinear Algebra, v11 p243-252 1982.

No abstract available.

AD-A117 774/0 Not available NTIS
Florida Univ., Gainesville. Center for Mathematical System Theory.
Further Results on Polynomial Characterizations of (F,G)-Invariant and Reachability Subspaces,
Pramod P. Khargonekar, and Erol Emre. 27 Jun 80, 17p ARO-15077.15-MA
Contract DAAG29-80-C-0050, Grant AFOSR-76-3034
Availability: Pub. in IEEE Transactions on Automatic Control, vAC-27 n2 p352-366 Apr 82 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A117 775/7 Not available NTIS
Florida Univ., Gainesville. Center for Mathematical System Theory.
Realization Theory of Infinite-Dimensional Linear Systems. Part I,
Yutaka Yamamoto. 3 Jan 79, 25p ARO-18343.16-MA
Contract DAAG29-81-K-0136, Grant DAAG29-77-G-0225
Supported in part by Grant AFOSR-76-3034.
Availability: Pub. in Mathematical Systems Theory, v15 p55-77 1981 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A117 782/3 PC **A02**/MF **A01**
Rutgers - The State Univ., New Brunswick, NJ. Dept. of Mathematics.
Sum Rules for Inhomogeneous Coulomb Systems,
Ch. Gruber, Joel L. Lebowitz, and Ph. A. Martin. 8 Jan 81, 12p AFOSR-TR-82-0601
Grants AFOSR-82-0016, NSF-PHY78-15920
Pub. in Jnl of Chemistry and Physics, v75 n2 p944-954, 15 Jul 81.

No abstract available.

AD-A117 893/8 PC **A02**/MF **A01**
Stanford Univ., CA. Dept. of Computer Science.
Group Velocity in Finite Difference Schemes,
Lloyd N. Trefethen. 2 Apr 81, 25p
Contract N00014-75-C-1132
Pub. in SIAM Review, v24 n2 p113-136 Apr 82.

No abstract available.

AD-A117 894/6 PC **A02**/MF **A01**
Stanford Univ., CA. Dept. of Computer Science.
Real Polynomial Chebyshev Approximation by the Caratheodory-Fejer Method,
Martin H. Gutnecht, and Lloyd N. Trefethen. 23 Sep 80, 15p
Contract N00014-75-C-1132
Pub. in SIAM Jnl. of Numerical Analysis, v19 n2 p358-371 Apr 82.

No abstract available.

AD-A117 913/4 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Research Lab. of Electronics.
Absence of Statistical Fluctuations in Quasi-One-Dimensional Disordered Systems,
A. Douglas Stone, and J. D. Joannopoulos. 5 Nov 81, 6p
Contract N00014-77-C-0132
Pub. in Physical Review B, v25 n2 p1431-1434 1982.

No abstract available.

DE82008144 MF **A01**
Oak Ridge National Lab., TN.
KWIC Index for Numerical Algebra.
J. A. Carpenter. Mar 82, 123p ORNL/CSD-96
Contract W-7405-ENG-26
Portions of document are illegible.
Microfiche copies only.

This report is a sequel to ORNL/CSD-46: KWIC Index For Numerical Algebra (March 1980) and in turn the both of these ae sequels to Professor A.S. Householer's report of the same name: ORNL-4778 Revised (June 1975). The area covered remains nearly the same as Professor Householder's guidelines, roughly delineated by the American Mathematical Society classification 15, 65F and 65H together with their secondary categories, but with little coverage of infinite matrices, matrices over fields of positive characteristic, operator theory, optimization and those facets of matrix theory primarily combinatorial in nature. The period covered by this report is roughly July 1979 through December 1980, as measured by the appearance of the articles in the American Mathematical Society's Contents of Mathematical Publications. The review citations are limited to the Mathematical Reviews (MR) and Das Zentralblatt fur Mathematik Und Ihre Grenzgebiete. (ERA citation 07:048673)

DE82902432 PC **A02**/MF **A01**
Hahn-Meitner-Inst. fuer Kernforschung Berlin G.m.b.H. (Germany, F.R.). Bereich Datenverarbeitung und Elektronik.
Interpretation of Experimental Data Using Optimal Estimation.
F. M. Larkin. Jul 81, 23p HMI-B-358
Portions of document are illegible.
U.S. Sales Only.

Techniques of Optimal Estimation are assessed from the point of view of providing a rational basis for the interpretation of experimental data. It is emphasized that the measurement operations should (often) correspond to bounded linear functionals on an underlying Hilbert space, and the difficulties which arise when this correspondence cannot be made are illustrated by examples.

N82-28039/7 PC **A03**/MF **A01**
von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).
Comparison of Recurrence Formulas and the Lentz Algorithm for the Computation of Spherical Bessel Functions in Mie Scattering Applications.
M. Timmerman. May 81, 34p VKI-TM-31

Computer programs which evaluate spherical Bessel functions of the first and second kind are presented. The computation is done in two ways: with recurrence formulas and with the Lentz algorithm. The results and tabulated values are compared. For values of N smaller than the integer part of the argument, the recurrence formulas do very well. A general scheme is proposed for this case that makes use of both the reccurence formulas and Lentz algorithm. For values of N greater than the integer part of the argument, single precision routines can do the job satisfactorily.

N82-28049/6 PC **A02**/MF **A01**
National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
Polynomial Systems in a Category.
G. Naude. Sep 81, 12p CSIR-TWISK-229

Discrete time systems described by equations of the form $q(t+1) = P(q(t),U(t))$, $y(t) = H(q(t))$ where P and H are polynomial maps, were investigated. A theory of reachability, observability, and realization developed for polynomial systems in the category of k-affine spaces is discussed. A functor is introdced as an adjoint process for the category of k-spaces. It is shown that there is a natural transformation eta: chi approaches Z = -xU such that eta Q is epic for every k-space Q. It is deduced that every dynamics delta: Q x U approaches Q induces in a natural way a dynamics delta: chi Q approaches q, so that the theory of chi-systems is more general than that of -xU systems. A 'dynamic interpretation functor' is constructed which assigns to a chi-system its underlying sequential machine.

N82-28050/4 PC **A09**/MF **A01**
National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
A Global Method for Solving Stiff Differential Equations.
L. Rolfes. Aug 81, 195p CSIR-TWISK-228

A global method for solving stiff differential equations is presented and evaluated. The approach is similar to that followed when solving two point boundary value problems. The derivatives in the initial value problem are approximated by central finite difference expressions at all the N - 1 interior points and by a backward finite difference expression of matching order at the end points. This gives rise to a set of N algebraic equations in the N unknowns; the approximations to the exact solutions at the points x sub n, n=1,2...,N may then be solved simultaneously to obtain the approximate solution y sub n, n=1,...,N over the whole interval considered. The implementation considered is based on second order finite difference approximations, causing the global method to be a second order method that is unconditionally stable. Higher order methods may be obtained by using higher order approximations or extrapolation techniques without sacrificing unconditional stability. It is concluded that the global method is a robust, reliable method for stiff systems.

N82-28051/2 PC **A02**/MF **A01**
National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
Generalized Rank Conditions for Systems in a Category.
C. Nolte. Aug 81, 20p CSIR-TWISK-224

A generalized rank condition is used to deduce necessary and sufficient conditions for the reachability and observability of a system in a category. A duality principle between reachability and observability is established. These results generalize those known previously for bilinear and linear systems over rings.

N82-28052/0 PC **A02**/MF **A01**
National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
Polynomial Systems as Adjoint Process Machines.
G. Naude. Aug 81, 21p CSIR-TWISK-223

By defining a suitable adjoint process in the category of k-spaces, it is shown that systems that can be described by polynomial equations can be studied via the Arbib-Manes model of machines in a category. Basic results regarding reachability, observability, and realization are derived from the general theory.

N82-28053/8 PC **A02**/MF **A01**
National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
The Use of Auto-Correlation to Determine the Pseudo-Rank of Noisy Ill-Conditioned Systems of Linear Equations.
M. L. Baart. Aug 81, 16p CSIR-TWISK-222

The determination of the pseudo-rank of a system of linear equations is complicated by ill conditioning and the presence of noise in the matrix elements and/or data. A method is proposed for selecting a pseudo-rank suitable for calculating approximate least squares solutions, by considering autocorrelation properties of the residual vector. The method is inspired by one previously proposed for the fitting of curves to data, and presupposes a given ordering of the equations. The method is applied to selected ill-conditoned systems with added random noise, and the accuracy of the calculated solutions is investigated. Pseudo-ranks determined by generalized cross validation are used for comparison, and the relative accuracy of the computed solutions is considered. Results indicate that for the examples considered, autocorrelated pseudo-rank determination is more reliable.

N82-28054/6 PC **A03**/MF **A01**
National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
Numerical Stability of the Fast Convergent Diagonally Approximating Difference Schemes.
E. E. Rosinger. Aug 81, 32p CSIR-TWISK-220

A sal nonlinear method for the uniform approximation of sufficiently smooth solutions of nonlinear evolution partial differential equations (PDEs) by solutions of specially constructed sequences of ordinary differential equations (ODEs) is discussed. Computer applications showed that explicit one-step numerical approximations of the solutions of the ODEs exhibited fast convergence to the smooth solution of the initial evolution PDEs. The stability of the fast convergent diagnoal approximation in the presence of round-off errors is proved. For the sake of simplicity the proof is given for the linear case of a pure initial value problem with data in a certain class of quasi-analytic functions. It is also possible, but more difficult, to prove stability in the nonlinear case and for a wider classes of initial data.

N82-28055/3 PC **A02**/MF **A01**
National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
A Cramer Rule for Least-Norm Solutions of Consistent Linear Equations.
A. Ben-israel. Oct 81, 7p CSIR-TWISK-235

The least (Euclidean-) norm solution of a consistent linear equation Ax = b is given a determinantal form. This reduces the Cramer's rule if A is nonsingular.

N82-28056/1 PC **A03**/MF **A01**
New Mexico State Univ., Las Cruces. Dept. of Mathematical Sciences.
Geometrically Derived Difference Formulae for the Numerical Integration of Trajectory Problems.
R. J. Y. Mcleod, and J. M. Sanz-serna. Sep 81, 34p NASA-CR-169098, NAS 1.26:169098
Sponsored in Cooperation with NASA, NATO, and the British Council in Spain Prepared in Cooperation with Nrims, Pretoria, South Africa.

The term 'trajectory problem' is taken to include problems that can arise, for instance, in connection with contour plotting, or in the application of continuation methods, or during phase-plane analysis. Geometrical techniques are used to construct difference methods for these problems to produce in turn explicit and implicit circularly exact formulae. Based on these formulae, a predictor-corrector method is derived which, when compared with a closely related standard method, shows improved performance. It is found that this latter method produces spurious limit cycles, and this behavior is partly analyzed. Finally, a simple variable-step algorithm is constructed and tested.

N82-28057/9 PC **A03**/MF **A01**
National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
Splines and the Projection Collocation Method for Solving Integral Equations in Scattering Theory.
M. Brannigan, and D. Eyre. Sep 81, 28p CSIR-TWISK-230

The method of projection collocation using cubic B-spline approximants to solve singular integral equations arising in scattering theory is examined. Theoretical error bounds are provided for the approximation which give criteria for estimating the efficiency and convergence of the method. As numerical examples, the two-body K-matrix equation with a separable potential and the Reid 'S sub 0 soft-core potential are solved.

N82-28063/7 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
On the Application and Extension of Harten's High Resolution Scheme.
H. C. Yee, R. F. Warming, and A. Harten. Jun 82, 39p A-8952, NAS1.15:84256, NASA-TM-84256

Extensions of a second order high resolution explicit method for the numerical computation of weak solutions of one dimensonal hyperbolic conservation laws are discussed. The main objectives were (1) to examine the shock resoluton of Harten's method for a two dimensional shock reflection problem, (2) to study the use of a high resolution scheme as a post-processor to an approximate steady state solution, and (3) to construct an implicit in the delta-form using Harten's scheme for the explicit operator and a simplified iteration matrix for the implicit operator.

N82-28098/3 PC **A03**/MF **A01**
Weizmann Inst. of Science, Rehovoth (Israel). Dept. of Physics.
A Class of Yang-Mills Solutions.
L. Castillejo, and M. Kugler. Sep 80, 30p WIS-PH-80/39

The symmetry of the class prescribes a natural set of gauge invariant degrees of freedom. Using these degrees of freedom, a simple set of equations were obtained which were used to find all the solutions belonging to the class under discussion.

N82-28101/5 PC **A02**/MF **A01**
Royal Inst. of Tech., Stockholm (Sweden). Dept. of Numerical Analysis and Computing Science.
On the Local and Global Errors of One-Leg Methods.
G. Dahlquist. 1981, 22p TRITA-NA-8110

The local discretization error of a variable step one-leg method is defined. An asymptotic theory is presented for computations with smoothly varying step size. A two-parameter family of one-leg k-step methods is studied for which the order of consistency is not less than k. Almost-contractivity in variable step size computation is commented on.

N82-28102/3 PC **A03**/MF **A01**
Royal Inst. of Tech., Stockholm (Sweden). Dept. of Numerical Analysis and Computing Science.
On One-Leg and Linear Multistep Formulas with Variable Step-Sizes.
J. Sand. 1981, 48p TRITA-NA-8112
Sponsored in Part by the Danish Natural Science Research Counsel.

The idea of using one-leg formulas instead of linear multistep formulas is considered. Both sets of formulas in the case of variable step-sizes are compared. Whereas useful linear multistep formulas of order p sub n (in the n'th step) with only p sub n + 2 nonvanishing coefficients exist for all p sub n or = 1, any one-leg formula requires at least 2 p sub n nonvanishing coefficients (p sub n in either characteristic polynomial) in order to obtain the same order. For linear multistep formulas, one of the techniques commonly used to ensure zero or (A infinite) stability, also for the variable-step versions, consists in freezing the roots of one of the characteristic polynomials. This technique applied to any pure one-leg formula causes the order of the variable-step version to be 2 at most (in general).

N82-28103/1 PC **A03**/MF **A01**
Royal Inst. of Tech., Stockholm (Sweden). Dept. of Numerical Analysis and Computing Science.
On the Efficient Solution of Nonlinear Equations in Numerical Methods for Stiff Differential Systems.
G. Soederlind. 1981, 48p TRITA-NA-8114

Methods that perform efficiently by utilizing some partitioning of stiff differential systems with only few stiff eigenvalues are reviewed and compared. Sparse matrix techniques lead to substantial improvements over the efficiency of implicit methods if the sparsity pattern of the Jacobian is favorable. Other methods all replace the Jacobian by a matrix with some advantageous structure. Thus, the methods are either tearing methods or methods of modification where some or all elements of J are modified in order to make a low-rank approximation possible. Findings indicate that there is no efficient method available today that performs automatic partitioning for general stiff problems.

N82-28104/9 PC **A02**/MF **A01**
Royal Inst. of Tech., Stockholm (Sweden). Dept. of Numerical Analysis and Computing Science.
Theoretical and Computational Aspects on Partitioning in the Numerical Integration of Stiff Differential Systems.
Ph.D. Thesis.
G. Soederlind. 1981, 14p TRITA-NA-8115
Sponsored in cooperation with Itm.

Concepts of computerized simulation of dynamic systems are summarized. These include stability properties of linear multistep compound discretizations of partitioned differential systems. The computer program DASP3, a program for the numerical integration of partitioned stiff ordinary differential equations and differential algebraic systems, is mentioned. Multiple step G-contractivity with applications to slowly varying linear systems is covered. Error propagation in stiff differential systems of singular perturbation type and the efficient solution of nonlinear equations in numerical methods for stiff differential systems are also treated.

N82-28105/6 PC **A03**/MF **A01**
Royal Inst. of Tech., Stockholm (Sweden). Dept. of Numerical Analysis and Computing Science.
Solving an Interface Problem for the Laplace Operator by the Boundary Collocation Method.
L. Reichel. 1981, 31p TRITA-NA-8116

A solution in the form of a linear combination of particular solutions of a differential equation is sought in order to obtain approximate solutions to boundary problems for linear partial differential equations. A simple method for doing this is the boundary collocation method (BCM). The BCM is applied to a model interface problem for the Laplace operator. The boundary condition is a continuity condition across the interface. This interface problem as well as a related approximation problem are described. The allocation of collocation points for various subspaces and selection of the subspace are considered through numerical examples. An optimization problem is explicated.

N82-28106/4 PC **A03**/MF **A01**
Royal Inst. of Tech., Stockholm (Sweden). Dept. of Numerical Analysis and Computing Science.
A Fast Method for Solving Certain Integral Equations of the First Kind with Application to Conformal Mappings.
L. Reichel. 1981, 32p TRITA-NA-8117

A fast iterative solution method for Fredholm integral equations of the first kind with a logarithmic kernel as principal part is described. The method is a Fourier-Galerkin method. Due to the singularity of the kernel, the linear system of simultaneous equations is block diagonal dominant and can be solved rapidly by an iterative method. Examples of the computation of conformal mappings of simply and multiply connected domains are presented.

N82-28107/2 PC **A04**/MF **A01**
Sheffield Univ. (England). Dept. of Control Engineering.
Robust Controller Design for Uncertain Dynamic Systems Using Approximate Models. Part 1: The Single-Input/Single-Output Case.
D. Owens, and A. Chotai. Oct 81, 54p RR-161
Contract SERC-GR/B/23250

Controller design for continuous and discrete systems whose models are unknown or highly complex is discussed. These designs are frequently based on the use of a simple, approximate and, very often, rough-and-ready model. In such circumstances it is vital to be able to quantify the degree of uncertainty to be expected from the use of such a model for prediction of closed loop characteristics. It is shown how classical frequency domain design techniques can be extended to incorporate information deduced from the observed differences between open loop plant and approximate model step response to quantify this uncertainty and, in particular, to guarantee closed loop stability and tracking of step demands. A modification of this analysis also yields the possibility of bounding the error in prediction of closed loop transient performance. The approaches are all graphical in nature and can be easily implemented in an interactive computer aided design mode.

N82-28109/8 PC **A02**/MF **A01**
Purdue Univ., Lafayette, IN. Lab. for Applications of Remote Sensing.
Predicting the Required Number of Training Samples.
H. M. Kalayeh, and D. A. Landgrebe. 1982, 13p
NASA-CR-169091, NAS 1.26:169091
Grant NSG-5414

A criterion which measures the quality of the estimate of the covariance matrix of a multivariate normal distribution is developed. Based on this criterion, the necessary number of training samples is predicted. Experimental results which are used as a guide for determining the number of training samples are included.

N82-28126/2 PC **A02**
Sheffield Univ. (England). Dept. of Control Engineering.
Parameter Estimation Techniques for Nonlinear Systems.
S. A. Billings, and I. J. Leontaritis. Mar 82, 7p RR-172
Presented at 6TH Ifac Symp. On Identification and System Parameter Estimation, Washington, D.C., June 1981.

The identification of nonlinear systems, using parameter estimation methods based on input-output models, is considered. A nonlinear difference equation representation for a wide class of nonlinear systems is introduced by considering the observability of nonlinear systems and extending the classical autoregressive moving average model to include polynomic terms. The effects of internal noise are investigated and modified recursive extended least squares and maximum likelihood algorithms are derived and shown to produce unbiased estimates in the presence of multiplicative noise.

PATENT-4 308 449 Not available NTIS
Department of the Army, Washington, DC.
Tactical Nuclear Slide Rule.
Patent,
Clair S. Kelley. Filed 26 Jul 78, patented 29 Dec 81, 6p AD-D009 551/3, PAT-APPL-928 219
Supersedes PAT-APPL-928 219-78, AD-D006 639.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A calculational aid is provided, in the form of a slide rule, to facilitate calculation of damages inflicted by a nuclear detonation. The particular apparatus permits calculation of the effects of an air blast, due to static overpressure, resulting from such a detonation. Appropriate scales, properly spaced in particular relationships, are provided on a slide rule, thus providing a means for performing the calculations utilize five parameters, and the present invention provides an apparatus for determining any one of the five parameters once the other four are known. (Author)

PATENT-4 310 750 Not available NTIS
Department of the Army, Washington, DC.
Tactical Nuclear Slide Rule for a Plurality of Environments.
Patent,
Clair S. Kelley. Filed 31 Aug 78, patented 12 Jan 82, 7p AD-D009 549/7, PAT-APPL-938 560
Supersedes PAT-APPL-938 560-78.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A calculational aid is provided, in the form of a slide rule, to facilitate calculation of probable damage inflicted by a nuclear detonation. The particular apparatus permits calculation of any or more of several damage-causing environments induced by nuclear detonations, and the consequential probability of damage resulting from such a detonation caused by the particularly calculated environment. Appropriate scales, properly spaced in particular relationships, are provided on a slide rule, thus providing a means for performing the calculational functions described above. Each of the possible environment-related damage calculations utilizes five parameters, and the present invention provides an apparatus for determining any of the five parameters once the other four are known. (Author)

PB82-250457 PC **A02**/MF **A01**
Groningen Rijksuniversiteit (Netherlands). Mathematisch Inst.
Etale Coverings of a Mumford Curve,
Marius van der Put. 1982, 24p ZW-8023

An algebraic curve X is defined over a complete non-archimedean valued field K. In order to obtain enough unramified coverings Y (arrow) X, one has to suppose that X is a Mumford curve. One further distinguishes between merely unramified (or etale) coverings and analytic coverings. This is done in section 1. In the next section the abelian etale coverings of a Mumford curve over an algebraically closed field are constructed. In section 3 the base field is a local field and the abelian unramified extensions of the function field of the curve X are calculated.

PB82-250465 PC **A03**/MF **A01**
Groningen Rijksuniversiteit (Netherlands). Mathematisch Inst.
Generic Singularities of the Exponential Map of Riemannian Manifolds,
F. Klok. 1980, 33p ZW-8022

The aim of this paper is to prove a theorem conjectured by Wall in a 1977 paper.

PB82-250473 PC **A03**/MF **A01**
Groningen Rijksuniversiteit (Netherlands). Mathematisch Inst.
Finite Dimensional Compensators for Parabolic Distributed Systems with Unbounded Control and Observation,
R. F. Curtain. Feb 82, 32p TW-234

It is proved that, for a class of parabolic distributed parameter systems with unbounded control and observation, there exists a finite dimensional compensator using dynamic output feedback. Finite dimensional means here that the dynamics relating the input to the output is finite dimensional. A constructive design algorithm is presented and several examples are considered.

PB82-250481 PC **A02**/MF **A01**
Groningen Rijksuniversiteit (Netherlands). Mathematisch Inst.
Moduli of Singularities of Vector Fields,
Floris Takens. 1980, 8p ZW-8021

Recently a number of situations were discovered where ratios between eigenvalues, of singularities of vectorfields, or of fixed points of diffeomorphisms, appeared as topological invariants. These phenomena were related with non-transverse intersections of stable and unstable manifolds. In this note the author gives an example where such moduli appear at isolated singularities of vectorfields (i.e. independent of non-transverse intersection of stable and unstable manifolds). Singularities with such moduli can in general not be avoided in generic 6-parameter families of vectorfields.

PB82-250507 PC **A02**/MF **A01**
Technische Hogeschool, Delft (Netherlands). Onderafdeling der Wiskunde en Informatica.
Fast Approximation by Means of Convolution Operators,
P. C. Sikkema. 1981, 25p 81-05

No abstract available.

PB82-251588 PC **A02**/MF **A01**
Technische Hogeschool, Delft (Netherlands). Onderafdeling der Wiskunde en Informatica.
A Sequence of Linear Positive Operators Equivalent to the Baskakov Operators,
J. A. H. Alkemade. 1982, 18p 82-14

No abstract available.

PB82-251596 PC **A05**/MF **A01**
Technische Hogeschool, Delft (Netherlands). Onderafdeling der Wiskunde en Informatica.
A Course in Distance-Regular Graphs,
C. Roos. 1982, 96p 82-15

Contents; Distance-regular graphs (DRG)--Definitions and examples; The Bose-Mesner algebra of a DRG; The multiplicities; The co-intersection numbers; Subsets in a DRG; Subsets in a cometric DRG; Pairs of subsets in a DRG.

PB82-251612 PC **A03**/MF **A01**
Technische Hogeschool, Delft (Netherlands). Onderafdeling der Wiskunde en Informatica.
Aspects of Numerical Methods for Elliptic Singular Perturbation Problems,
A. Segal. 1981, 48p 81-08

The purpose of this paper is to analyze numerical problems related with boundary layers such as occur for example in flows governed by the Navier-Stokes equations. Upwind difference, defect-correction and central difference schemes for the solution of the convection-diffusion equation with small viscosity coefficient are compared. It is shown that central difference schemes and hence also standard Galerkin finite element methods are preferable above upwind and defect correction schemes, when Gaussian elimination is used for the solution of the resulting system of equations. When iterative solution methods are employed good results can be achieved by a defect-correction method, whereas upwind difference schemes are generally inaccurate.

PB82-251620 PC **A02**/MF **A01**
Technische Hogeschool, Delft (Netherlands). Onderafdeling der Wiskunde en Informatica.
Solution of the Stationary Boussinesq Equations by Finite Element Methods,
A. Segal. 1982, 14p 82-10

In this report some results of computations on a free convection problem by finite element methods are presented. It is shown that for small Rayleigh numbers, temperature and velocity may be uncoupled during the computation, but that higher Rayleigh numbers require

a coupled solution method, for example a Newton Raphson technique.

PB82-251653 PC **A04**/MF **A01**
Technische Hogeschool, Delft (Netherlands). Onderafdeling der Wiskunde en Informatica.
Numerical Solution of the Navier Stokes Equations by Means of the Finite Element Method, Part 1,
A. Segal. 1981, 51p 81-19

In this report an extended survey is given of methods for discretizing the continuity equation in the case of the stationary (Navier) Stokes equations. Of each method, advantages and disadvantages are given. The discussion is limited to isothermal laminar flow. Instationary flow will be treated in another report (Part 2).

PB82-251679 PC **A02**/MF **A01**
Technische Hogeschool, Delft (Netherlands). Onderafdeling der Wiskunde en Informatica.
On Erdoes Property P1 for the Arithmetical Sequence,
R. Sattler. 1982, 11p 82-03

No abstract available.

PB82-251687 PC **A02**/MF **A01**
Technische Hogeschool, Delft (Netherlands). Onderafdeling der Wiskunde en Informatica.
Optimal Control of Dynamic Systems,
C. de Wit. 1982, 25p 82-04

This paper is a brief treatment of Optimal Control Theory. Broad topics discussed include the following: Controlled Dynamic Systems; The Minimal Time Problem; and, The General Optimal Control Problem.

PB82-251695 PC **A02**/MF **A01**
Technische Hogeschool, Delft (Netherlands). Onderafdeling der Wiskunde en Informatica.
A Robust and Efficient Multigrid Method,
P. Wesseling. 1982, 25p 82-05

A multigrid method is described for an arbitrary elliptic partial differential equation with continuous coefficients on a rectangular region. The method is perceived by the user just as any other solver of linear algebraic systems. The user has to specify the matrix and right-hand-side only and does not need to be familiar with multigrid methods. The main ingredients of the method are the use of incomplete LU-decomposition for smoothing, Galerkin coarse-grid approximation, 7-point prolongation and restriction, and a fixed multigrid strategy. Application to various test-problems shows the method to be efficient and robust. Its efficiency is compared with the efficiency of other multigrid methods.

PB82-251810 PC **A02**/MF **A01**
Technische Hogeschool, Delft (Netherlands). Onderafdeling der Wiskunde en Informatica.
Slow Approximation with Convolution Operators,
P. C. Sikkema. 1981, 16p 81-04

In this paper it is proved that the class B of functions beta with which the convolution operators (U sub rho) are constructed contains elements such that if f belongs to a certain class M and if (f double prime) (x) exists, the rate of approximation of f(x) by ((U sub rho)f)(x) (rho approaches infinity) is very small.

PB82-251828 PC **A04**/MF **A01**
Technische Hogeschool, Delft (Netherlands). Onderafdeling der Wiskunde en Informatica.
An Algorithm and Implementing Software for Calculating Convolution Integrals Involving Distributions with a Singularity at the Origin,
D. J. McConalogue. 1981, 52p 81-03

This report is made up of two parts: the first is a self-contained description of an algorithm for numerical convolution of distributions which may have a singularity at the origin; the second is a description of a FORTRAN implementation of the algorithm, together with listings of the implementing subroutines. In addition to the basic routines, the second part describes and lists ad hoc routines for use with the basic routines to convolute the exponential, gamma, Weibull, lognormal, inverse Gaussian and truncated normal distributions.

PB82-251836 PC **A03**/MF **A01**
Technische Hogeschool, Delft (Netherlands). Onderafdeling der Wiskunde en Informatica.
On the Feasibility of Intersection Matrices of Type Lm(s,t,c),
C. Roos, and A. J. van Zanten. 1981, 36p 81-02

This paper deals with the theory of distance-regular graphs; this theory was initiated by N. Biggs, and independently by Delsarte, whose so-called metric association schemes are distance regular graphs, in fact.

PB82-252677 PC **A02**/MF **A01**
Technische Hogeschool, Delft (Netherlands). Onderafdeling der Wiskunde en Informatica.
Numerical Solution of Bang Bang Control Problems with Sequential Quasi Linearization,
C. de Wit. 1982, 24p 82-07

This study relates to dynamic systems with a linear or 'nearly linear' time behavior. The problems are solved with the method of quasilinearization. The iterating sequence is stopped, as soon as the control has a sufficiently close resemblance to a purely bang bang control.

PB82-252685 PC **A02**/MF **A01**
Technische Hogeschool, Delft (Netherlands). Onderafdeling der Wiskunde en Informatica.
High-Order Approximation with Convolution Operators,
P. C. Sikkema. 1981, 22p 81-13

No abstract available.

PB82-252701 PC **A02**/MF **A01**
Technische Hogeschool, Delft (Netherlands). Onderafdeling der Wiskunde en Informatica.
A Generalization of a Sequence of Linear Positive Operators,
J. A. H. Alkemade. 1981, 14p 81-14

No abstract available.

PB82-253055 PC **A04**/MF **A01**
Cambridge Univ. (England). Dept. of Engineering.
The Application of Generalized Diagonal Dominance to Linear System Stability Theory,
D. J. N. Limebeer. 1982, 57p CUED/F-CAMS/TR-222-1982
Also pub. in ISSN-0309-765X.

A study was made at the generalization of two aspects of Rosenbrock's stability theorems. His diagonal dominance condition was replaced by a less restrictive generalized diagonal dominance condition. Systems which were only generalized block diagonally dominant could be treated using the Nyquist array approach. Theorems were described which were useful for evaluating loop robustness with respect to actuator and sensor gain variations and for analysing the stability of large systems easily decomposed into subsystems for analysis. Interconnected power systems could be treated as individual power stations or turbogenerators. Graphical interpretations were used to facilitate the implementation of the ideas into computer-aided-design packages.

PB82-253253 PC **A02**/MF **A01**
Cambridge Univ. (England). Dept. of Engineering.
On Infinite Zeros
Final rept.,
Antonis I. G. Vardulakis. Oct 79, 25p CUED/F-CAMS/TR-196-1979
Also pub. in ISSN-0309-765X.

The infinite zero structure of completely controllable and observable linear multivariable systems which give rise to square, nonsingular, strictly proper transfer function matrices is investigated via the polynomial matrix approach to the solution of the decoupling problem. In the process, various connections between infinite zeros, their degrees and geometric and polynomial matrix ideas, are demonstrated. The asymptotic behavior of closed loop eigenvectors under high gain output feedback is also examined.

12B. Operations Research

AD-A117 607/2 PC **A03**/MF **A01**
Stanford Univ., CA. Systems Optimization Lab.
User's Guide for SOL/QPSOL: A Fortran Package for Quadratic Programming.
Technical rept.,
Philip E. Gill, Walter Murray, Michael A. Saunders, and Margaret H. Wright. Jun 82, 35p SOL-82-7, ARO-18424.7-MA
Contracts DAAG29-81-K-0156, DAAG29-79-C-0110
Sponsored in part by Contract DE-AT03-76ER72018 and Grants NSF-MCS79-26009 and NSF-ECS80-12974.

This report forms the user's guide for SOL/QPSOL, a set of Fortran subroutines designed to locate the minimum value of an arbitrary quadratic function subject to linear constraints and simple upper and lower bounds. If the quadratic function is convex, a global minimum is found; otherwise, a local minimum is found. The method used is most efficient when many constraints or bounds are active at the solution. The subroutines are not intended for large sparse problems, but they will be useful for problems with up to several hundred variables and relatively few general constraints. (Author)

PB82-251604 PC **A02**/MF **A01**
Technische Hogeschool, Delft (Netherlands). Onderafdeling der Wiskunde en Informatica.
Conditioned Limit Theorems for Waiting Time Processes of the M/G/1 Queue,
G. Hooghiemstra. 1982, 22p 82-16

This paper is on conditioned weak limit theorems for imbedded waiting time processes of an M/G/1 queue. More specifically, the author studies functional limit theorems for the actual waiting time process conditioned by the event that the number of customers in a busy period exceeds n or equals n. Attention is also paid to the actual waiting time process with random time index. Combined with the existing literature on the subject this paper gives a complete account of the conditioned limit theorems for the actual waiting time process of an M/G/1 queue for arbitrary traffic intensity and for a rather general class of service time distributions. The limit processes that occur are Brownian excursion and meander, while in the case of random time index also the following limit occurs: Brownian excursion divided by an independent and uniform (0,1) distributed random variable.

PB82-251661 PC **A02**/MF **A01**
Technische Hogeschool, Delft (Netherlands). Onderafdeling der Wiskunde en Informatica.
On Transience and Recurrence of Generalized Random Walks,
F. M. Dekking. 1981, 17p 81-20

A generalized random walk is a process of partial sums of a stationary and ergodic sequence of random variables. Many results of random walk theory (where the variables are supposed to be independent) carry over to this general setting. Section 1 gives the basic definitions and a survey of some of the main results. Section 2 discusses the Peano curve as a generic point for a generalized random walk. In Section 3 we generalize this construction, obtaining a class of generalized random walks which might be called deterministic, as the corresponding dynamical systems have zero entropy.

PB82-252719 PC **A03**/MF **A01**
Technische Hogeschool, Delft (Netherlands). Onderafdeling der Wiskunde en Informatica.
Performance Evaluation of Non-Linear Optimization Methods via Multi-Criteria Decision Analysis and via Linear Model Analysis,
F. A. Lootsma. 1981, 40p 81-15

This report shows how Saaty's priority theory for pairwise comparison can be used to evaluate the performance of non-linear optimization methods. First, priorities are assigned to the predominant performance criteria: generality, robustness, efficiency, capacity, simplicity of use, and program organization. Thereafter, the comparative studies of non-linear optimization codes are used to assign weights to the methods under each of the performance criteria separately. Here, Saaty's eigenvector method is modified, and logarithmic regression is employed in order to deal with incomplete and multiple pairwise comparisons. The procedure outlines what performance evaluation can do and what it cannot do: it demonstrates how multi-criteria decision analysis can be used for an integrated assessment of optimization methods, taking into account both the performance criteria of decision makers and the results of comparative studies. Finally, it is shown that efficiency weights can be obtained from these studies by the analysis of variance.

PB82-873555 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Minimax Techniques for Optimization. 1975-August, 1982 (Citations from the International Information Service for the Physics and Engineering Communities Data Base).
Rept. for 1975-Aug 82.
Aug 82, 229p

This bibliography contains citations concerning the use of the minimax technique to optimize the results in decision theory and control problems. Many of the computational methods involved in solutions to stochastic problems are presented in terms of specific applications. Some of these applications are control design, circuit design, capacity assignment, structural design, and filter design. The solutions apply to engineering, electronics, management, traffic control, and other complex or uncertain decision problems. (Contains 240 citations fully indexed and including a title list.)

13.

MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

13A. Air Conditioning, Heating, Lighting, and Ventilating

AD-A117 488/7 PC **A04**/MF **A01**
Manville Service Corp., Denver, CO. Research and Development Center.
High Efficiency Furnaces and Boilers (Oil).
Final rept. 28 Aug 81-1 May 82,
Mark Hatten. 1 May 82, 56p USA FESA-TS-2119
Contract DAAK70-78-C-0002

Residential, oil fired heating systems are excellent candidates for cost effective, energy conserving retrofits. Old systems may benefit from burner nozzle downsizing, burner replacement or replacement of the entire heating unit. Guidelines have been presented for selecting the most desirable retrofit for residential, oil fired heating units. (Author)

DE82005936 MF **A01**
National Center for Appropriate Technology, Butte, MT.
Review and Performance Analysis of SUEDE-Installed Solar-Energy Systems.
B. Riley, J. McBride, and B. Moody. 16 Dec 81, 273p DOE/CS/30277-T32
Contract FG01-79CS30277
Portions of document are illegible.
Available in microfiche only.

The SUEDE (Solar Utilization, Economic Development and Employment) Project consisted of two components. The initial program involved the training of 300 CETA workers to install solar devices on the houses of low-income people nationwide. The second component provided for the development and implementation of a low-cost monitoring program to assess the thermal performance and economic benefits accrued from these devices. Here, information concerning the monitoring and performance of 51 SUEDE-installed commercial and community-built solar domestic hot water systems, greenhouses, sunspaces and air heating systems is provided. (ERA citation 07:042952)

DE82008048 MF **A01**
Acurex Corp., Mountain View, CA.
Application of Solar Energy for the Generation and Supply of Industrial Process Low-to-Intermediate-Pressure Steam Ranging in Temperature from 300 exp 0 F to 500 exp 0 F (High-Temperature Steam).
M. A. Matteo, K. Yasuda, D. F. Brink, and P. T. Overly. 5 Jan 79, 101p DOE/CS/32196-T3
Contract AC03-78CS32196
Portions of document are illegible.
Available in microfiche only.

A conceptual design has been developed for a solar industrial process heat system. At the ERGON, Inc. Bulk Terminal in Mobile, Alabama, the 1874 m exp 2 (20160 ft exp 2) solar energy collector field will generate industrial process steam or heat at temperatures ranging from 150 exp 0 to 290 exp 0 C (300 exp 0 to 550 exp 0 F). The heat will be used to reduce the viscosity of stored oils and petrochemicals, making them easier to pump from storage. The solar energy system will provide approximately 44% of the process heat required. (ERA citation 07:042963)

DE82008081 PC **A12**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Analysis of Construction Costs of Ten Solar Industrial Process Heat Systems.
V. Greaver. Dec 81, 252p SERI/TR-09144-1
Contract AC02-77CH00178
Portions of document are illegible.
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Analyses of the construction of ten DOE-funded solar industrial process heat (IPH) systems were performed in a uniform manner to allow the identification of significant trends and areas for potential cost reductions. Cost data were collected for each system in the following breakdown structure: collector/array, support structure, piping/ductwork, insulation, heating and cooling equipment, storage, controls, and electrical and general construction. First, base construction costs of the ten solar IPH systems were determined. These data were normalized by adding contractor overhead and profit factors and then adjusting to a common year of construction (1980). The data were further modified to eliminate nonstandard construction costs and to include an average national labor rate. The resulting modified cost data are representative of the cost of reconstructing the systems today in typical industrial applications, after adjustment for inflation. (ERA citation 07:046377)

DE82008268 MF **A01**
Trinity Univ., San Antonio, TX.
Roof Pond Cooling Experiments Using the Passive Test Facility for Warm, Humid Climates.
P. Haves, E. Clark, F. M. Loxsom, M. Merino, and J. Mosley. Dec 81, 192p DOE/CS/30201-T7
Contract AC03-79CS30201
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

The warm humid climate Passive Test Facility at Trinity University in San Antonio, Texas has been used to investigate uncertainties in the heat transfer in passively cooled buildings. The two buildings were configured as modified roof pond systems, one with a wet surface and one with a dry surface. The major uncertainties addressed were the heat loss rates from wet and dry roof ponds and the heat transfer from a cooled ceiling with either natural convection or forced convection (ceiling fans). Experiments were also conducted to determine the temperature stratification in roof ponds and the ability of roof ponds to transfer heat laterally from localized sources of heat in the building. A description of the sensors and their installation is presented together with the configuration employed for each experiment. Results are presented in the form of graphs of selected data which are applicable to each of the major uncertainties. A preliminary analysis of the data has been performed and the results are presented. Convective heat transfer coefficients for the ceiling have been determined for different air speeds. A rule of thumb for the cooling performance of dry roof ponds has been produced and used to develop a feasibility criterion for such systems. (ERA citation 07:046336)

DE82008341 PC **A13**/MF **A01**
Solar Energy Research Inst., Golden, CO.
PROSYS/ECONMAT Users' Guide: Solar Industrial-Process-Heat Feasibility Evaluation.
S. Stadjuhar. Feb 82, 279p SERI/TR-733-724
Contract AC02-77CH00178
Portions of this report are illegible.

An analytical method is provided for evaluating the feasibility of solar industrial process heat applications for use in industrial analyses. The evaluation procedure uses a flexible, fast-calculating computer code - PROSYS/ECONMAT. The performance model PROSYS predicts long-term energy output for several collector types including flat-plate, nontracking concentrator, (evacuated tube, CPC), a one-axis tracking concentrator (parabolic trough), and a two-axis concentrator (parabolic dish). The economic code calculates solar equipment cost estimates, annual energy capacity cost, levelized price of solar energy, net present value, internal project rate of return, and payback. User input consists of industrial process information (e.g., process temperature, heat rate, present fuel type) and optional economic parameters (e.g., fuel cost, escalation, labor rates). The PROSYS/ECONMAT code has been used in a variety of analyses including industrial case studies, end-use matching, suitability mapping, and industrial feasibility analyses. Accuracy of algorithms and internal parameters in both the performance and economic models has been reviewed and improved. Data bases have been expanded - meteorological data (METDAT) to 231 sites and economic data (ECONDAT) to include state average fuel prices and labor rates. Default values for all critical variables have been selected to provide reasonable results. In addition, optional user input and control have been provided to allow the experienced user freedom to customize the analysis. (ERA citation 07:049870)

DE82008959 PC **A08**/MF **A01**
Los Alamos National Lab., NM.
Housing-Stock Characteristics for Solar-Market Analysis.
C. Kirschner, D. Brunton, K. LaValle, and F. Roach. Jan 82, 166p LA-9201-MS
Contract W-7405-ENG-36
Portions of document are illegible.
Microfiche only after original copies are exhausted.

Analysis of the market potential for passive solar designs requires a detailed housing data base. Information on projected housing starts and heating fuel use is necessary for proper analysis of potential adoption of new home designs. A housing stock data base that includes age, dwelling type, and fuel use characteristics for an appropriate geographical base is needed for analysis of passive solar retrofit potential. The development of a pre-1980 housing stock data base for 220 solar regions in the continental US is detailed. (ERA citation 07:042980)

DE82009038 MF **A01**
Southern Solar Energy Center, Atlanta, GA.
Performance Graphs for Solar-Savings Fraction Vs. Load-Collector Ratio for Selected Cities in the South.
D. W. Abrams, and G. A. Winkler. Jun 81, 27p SSEC/TP-41229
Contract AC02-79CS30166
Portions of document are illegible.
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A graphical presentation is provided of Solar Savings Fraction (SFF) versus Load Collector Ratio (LCR) for 14 southern cities. Individual plots are shown for five standard passive systems: direct gain, Trombe wall, water wall, Type A sunspace, and Type B sunspace. Both uninsulated and night-insulated systems are considered for a total of ten plots per site. Instructions for using the graphs to estimate Solar Savings Fraction and annual auxiliary energy consumption are also included. (ERA citation 07:043014)

DE82009480 PC **A02**/MF **A01**
Southern Solar Energy Center, Atlanta, GA.
Site Selection and Preliminary Evaluation of Potential Solar-Industrial-Process-Heat Applications for Federal Buildings in Texas.
30 Sep 80, 11p SSEC/TP-43161
Contract AC02-79CS30166

The potential for solr process heat applications for federal buildings in Texas is assessed. The three sites considered are Reese Air Force Base, Lubbock; Fort Bliss, El Paso; and Dyess Air Force Base, Abilene. The application at Lubbock is an electroplating and descaling facility for aircraft maintenance. The one at El Paso is a laundry facility. The Abilene system would use solar heat to preheat boiler feedwater makeup for the base hospital boiler plant. The Lubbock site is found to

be the most appropriate one for a demonstration plant, with the Abilene site as an alternate. The processes at each site are described. A preliminary evaluation of the potential contribution by solar energy to the electroplating facility at Reese AFB is included. (ERA citation 07:043016)

DE82009503 PC **A04**/MF **A01**
Southern Solar Energy Center, Atlanta, GA.
Economic Feasibility of Solar-Thermal Industrial Applications and Selected Case Studies.
A. Montelione, D. Boyd, and M. Branz. Dec 81, 57p SSEC/TP-31298
Contract AC02-79CS30166
Portions of document are illegible.

The economic feasibility is assessed of utilizing solar energy to augment an existing fossil fuel system to generate industrial process heat. Several case studies in the textile and food processing industries in the southern United States were analyzed. Sensitivity analyses were performed, and comparisons illustrating the effects of the Economic Recovery Tax Act of 1981 were made. The economic desirability of the proposed solar systems varied with the type of system selected, location of the facility, state tax credits, and type of fuel displaced. For those systems presently not economical, the projected time to economic feasibility was ascertained. (ERA citation 07:043012)

DE82009570 PC **A04**/MF **A01**
Southern Solar Energy Center, Atlanta, GA.
Passive Solar Cooling Competition: Design Program.
1980, 52p SSEC/SP-41106
Contract AC02-79CS30166

The requirements for the passive solar cooling competition are presented. The competition is run concurrently in four states: Puerto Rico, Louisiana, Oklahoma, and South Carolina. The awards categories and prizes are given. Sample forms and climatic data are included.

DE82009656 MF **A01**
Battelle Columbus Labs., OH.
Evaluation of Heat-Pipe Applications for Passive Solar Systems. Final Report, September 1977-June 1979.
J. M. Corliss. 1979, 312p DOE/CS/34222-T1
Contract AC02-77CS34222
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

Heat pipes offer a significant dimension to a number of thermal control and design problems. Several unique characteristics of heat pipes make them ideally suited for applications involving passive solar heating systems. Among the more useful of these characteristics are: (1) long distance, isothermal heat transport,; (2) thermal diode behavior; and (3) passive operation. Several analytical models were formulated to predict the thermal performance of passive heating systems in a variety of climates. Systems that were simulated were of the Trombe mass wall type and included both conventional passive heating systems with movable insulation systems and heat pipe augmented mass walls. Parametric analyses of several design variables have shown areas of significant manufacturing cost savings with little sacrifice in thermal performance as measured in terms of solar fraction. An experimental model of a heat pipe augmented passive solar heating system was designed and fabricated. Experimental investigations were conducted to verify key design criteria in the development of the heat pipe concept. Several candidate heat pipe concepts are presented and discussed. Manufacturing considerations and analytical work are described as they relate to the final module configurations selection. (ERA citation 07:042965)

DE82009873 PC **A12**/MF **A01**
Franklin Research Center, Philadelphia, PA.
Novel Control Systems for Solar-Assisted Systems That Reduce Electric-Utility Peak Loads. Final Report.
H. G. Lorsch. Sep 80, 269p DOE/ET/20085-T2, F-C-4827
Contract AC03-77ET20085

Water heating, space heating, and space cooling systems with and without solar assistance and with and without off-peak thermal storage were analyzed in Philadelphia, PA, Daytona Beach, FL, and San Diego, CA. Utility costs to serve and homeowners capital investment costs were determined for 1985 and 1995, and total annual costs were compared. Conclusions were drawn as to where and when the novel systems would be economical compared to conventional systems.

DE82009953 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Investigation of the Thermal Response of a Gasdynamic Heater with Helical Impellers. Calspan Report No. 6961-A-1.
W. J. Rae. Dec 81, 14p UCRL-15438
Contract W-7405-ENG-48
Portions of document are illegible.

A gasdynamic heater, capable of producing contamination-free gas streams at temperatures up to 9000 exp 0 K, is being developed by the Vulcan project. The design of a cooling system for the case parts and the associated thermal analysis are a critical part of a successful design. The purpose of the present work was to perform a preliminary cooling passage design and complete thermal analysis for the center body liner, end plate liners and exit nozzle. The approach envisioned for this work was the use of a set of LLNL finite-element codes, called MAZE and TACO2D. These were to be used at LLNL in a series of visits by the Calspan principal investigator. The project was cancelled shortly after the first of these visits; this report contains a summary of the work accomplished during the abbreviated contract period, and a review of the items that will need to be considered when the work is resumed at some future date. (ERA citation 07:044362)

DE82011281 MF **A01**
Resource Alternatives, Mossville, IL.
Solar Water Heater Lease Program. Interim Report.
Jan 82, 10p DOE/R5/10213-2
Contract FG02-80R510213
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

The Solar Water Heater Lease Program consists of the installation and leasing of ten solar systems to central Illinois homeowners. The measured energy savings to the homeowners and the impact of such systems on energy production requirements are studied. Each homeowner collects data on the gallons of hot water used, electricity used to heat water, and the temperatures of the cold and hot water outlet temperatures at the sink. The data are presented and conclusions are drawn, including the optimum slope of the collector, comparison of the actual hot water consumption and the estimated consumption, evaluation of the effects of temperature settings of the non-solar water heater, and the percentage of the energy provided for hot water by the solar system. The monitoring procedures and results are evaluated. Recommendations for improving the solar hot water systems are presented. (ERA citation 07:046354)

DE82011590 MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Technical-Assistance Report on a Geothermal Heating Utility for Lemmon, South Dakota.
Feb 82, 123p EGG-2144
Contract AC07-76ID01570
Portions of this report are illegible.
Best available copy from document source. Available in microfiche only.

The purpose of this effort was to review work already done toward establishing a geothermal heating utility in Lemmon, South Dakota; to redefine the goals for such a project; and to recommend how the project might proceeed to completion. The minimum size Phase I suggested would provide heat for up to 62 buildings in a 9-block area. Total cost is estimated at $1,800,000 to 1,950,000. The geothermal source is expected to be 100 to 400 gpm of 160 exp 0 F water pumped from 500 feet deep. Proposed energy savings and energy cost savings are presented. Analysis indicates that the major geothermal development effort in Lemmon should be directed toward the Madison aquifer. The minimum project dictates simple reinjection of the water after primary thermal extraction, although other uses are attractive and may be promoted if this resource is developed. A wide range of funding sources was investigated. Most promising avenues appear to be some form of local bond financing, and loans from the Farmer's Home Administration or the HUD Urban Development action grant program. The report suggests that a municipally-owned geothermal district heating utility be established, and a bond issue approved to pay for the initial well drilling, which is the major risk in the whole venture. A UDAG grant for 25% of the well cost may be obtainable. If the well proves successful, then the rest of the project can go forward. (ERA citation 07:043168)

DE82011931 PC **A02**/MF **A01**
Utah Water Research Lab., Logan.
Groundwater Heat Pump: An Efficient Way to Heat and Cool Your Home.
Dec 79, 13p DOE/ID/12016-T1
Contract FC07-79ID12016
Portions of document are illegible.

The economic feasibility of ground water heat pumps for residential heating and cooling in the Utah climate is examined. Results of the study indicate that this type of system conserves energy and may cost less than the conventional heating systems. A description of a heat pump is given and how a ground water heat pump works is described. The advantages of using ground water as a heat source for heat pumps, the coefficient of performance of such pumps, reliability, and cost of ground source heat pumps are discussed. Information is also provided on alternate uses of ground water, obtaining a well permit, well spacing, and availability of ground water. The use of solar energy to assist heat pump is briefly discussed. (ERA citation 07:043970)

DE82012045 PC **A03**/MF **A01**
Utah Water Research Lab., Logan.
Groundwater Heat Pump Equipment Selection Procedures for Architects, Designers and Contractors.
Mar 80, 29p DOE/ID/12016-T2
Contract FC07-79ID12016

The use of ground water heat pumps for residential space heating and cooling in the Utah climate is discussed. Results of the study indicate that this type of system conserves energy and may cost less for Utah home owners to operate than many conventional heating and cooling systems. The purpose of the publication is to answer questions on how a ground water heat pump works, coefficient of performance, the advantages of using groundwater, and reliability. Information is also presented on water wells and ground water availability, heating and cooling load calculations, calculation of water flow requirement, and well pump and supply/return pipe sizing. (ERA citation 07:043971)

DE82012046 PC **A02**/MF **A01**
Utah Water Research Lab., Logan.
Groundwater Heat Pump: The Interaction of Flow Rate, Aquifer Temperature Changes, and Well Spacing.
Jun 81, 16p DOE/ID/12016-T3
Contract FC07-79ID12016

The temperature changes in the aquifer due to the injected water from ground water heat pumps are described. The relationship of temperature changes to the spacing of the production and the injection wells and the density of heat pumps in an area are also considered. Descriptions of the existing aquifers in eleven cities in Utah are given. Adverse conditions to the expected and measures to control the conditions are discussed. (ERA citation 07:043972)

DE82012603 PC **A04**/MF **A01**
Argonne National Lab., IL.
Development of Nondestructive-Evaluation Techniques for High-Temperature Ceramic Heat-Exchanger Components. Fourth Annual Report, October 1980-September 1981.
D. S. Kupperman, and D. Yuhas. Jan 82, 67p ANL/FE-82-2
Contract W-31-109-ENG-38

An assessment has been made of ultrasonic techniques developed to date for nondestructive evaluation of SiC heat-exchanger tubes. The results suggest that ultrasonic inspection is a useful and valuable technique for inspecting these tubes, including ceramic butt joints. However, this method alone is currently not sufficiently effective to detect all critical flaws because of (a) the difficulties in following the surface of an out-of-round tube; (b) the high velocity and thus the large angle of refraction of sound in SiC, which for small-diameter tubes leads to significant beam distortion;

and (c) insuffient resolution, relative to the small critical flaw size in ceramics, at conventional ultrasonic testing frequencies. The experiments show that higher frequencies (up to 35 MHz) are required for effective wall-thickness measurements and detection of laminar-type flaws. While acoustic microscopy techniques for flaw and material characterization and holographic interferometry for crack sizing can be used for preservice inspection, in-service inspection of heat-exchanger tubes will probably be limited to ultrasonic inspection from the bore side. Acoustic microscopy (for flaw and material characterization) and holographic interferometry (for crack sizing), although not adaptable to boreside inspection, were shown to be effective as complementary or confirmatory techniques when used in conjunction with conventional ultrasonic testing. Preliminary results employing the microfocus radiography technique have indicated that this method is more sensitive than conventional radiographic techniques for ceramic butt joint assessment. (ERA citation 07:044395)

DE82012822 PC **A04**/MF **A01**
Department of Housing and Urban Development, Washington, DC.
Helio-Thermics, Inc., Lot No. 8 Single Family Residence, Greenville, South Carolina.
26 Mar 82, 58p SOLAR/1026-82/50
Contract AB01-76CS31020

The Helio-Thermics Inc. House Lot No. 8 is one of two instrumented single-family residences in Greenville, South Carolina. The home has approximately 1086 square feet of conditioned space. Solar energy is used for space heating and for preheating domestic hot water. The attic space is used as the solar energy collector. It has a 416-square-foot aperture and is painted black inside to maximize absorption. Warm air accumulates in the peak of the attic roof and circulates through the conditioned space or through storage by an air handler. Heat is stored in an 870-cubic-foot rock bin under the house. Cold water is preheated in the attic by thermosiphoning water from the 82-gallon preheat tank through a manifold system of copper tubes. These tubes are attached to black sheet-metal plates to enhance absorption. Preheated water is stored in the preheat tank and supplied on demand to a conventional 80-gallon domestic hot water tank. Freeze protection is provided for the liquid collector by drain down. Auxiliary space and water heating are electrical. The system has 8 modes of operation: collector-to-space heating; collector-to-storage; storage-to-space heating; auxiliary energy-to-space heating; summer mode, space cooling (outside air circulated through the living area); summer mode, passive cooling storage (in the attic and in the rock bin); summer mode, storage-to-space cooling; and domestic hot water preheating. The instrumentation for the National Solar Data Network is described briefly. Original cost estimates for provisioning and installation of the solar system, with the exception of instrumentation costs, are given. (ERA citation 07:043004)

DE82013253 PC **A03**/MF **A01**
General Electric Corporate Research and Development, Schanectady, NY.
Open-Cycle Heat Pumps for Industrial Waste-Heat Utilization. Project Technical Report, May 12, 1980-October 10, 1980. Phase I. Feasibility Study.
1980, 36p ORNL/Sub-80/2471/7, NYSERDA-81-28
Contract W-7405-ENG-26

Open-Cycle Industrial Process Heat Pumps (IPHP) are potentially a cost-effective method of utilizing an industrial plant's waste heat. The objective of Phase I of the work was to determine the feasibility of an open-cycle industrial process heat pump. This was accomplished by the evaluation of four potential sites for the installation of open-cycle industrial process heat pump equipment. While it was the original plan to evaluate only three sites, the need for a fourth site became apparent upon completion of studies of the Amstar applications. On the basis of initial screening, it was decided to concentrate on the large waste stream at General Electric's NORYL facility (Selkirk, NY) and a smaller waste stream at the Schoeller Paper Company (Pulaski, NY). These two sites provided opportunities to exploit the features of the open-cyle IPHP without major site constraints. Site studies were conducted to obtain process information such as flow rates, process temperatures, dynamic behavior of the process streams, process control functions, and capacity/time schedules. Information relating to structure and utilities, floor loadings, physical space constraints, electric service, piping runs between equipment location, and waste water tapping points was gathered. These data were analyzed and resulted in the selection of two applications with acceptable thermodynamic performance. (ERA citation 07:044068)

DE82900731 PC **A04**/MF **A01**
Styrelsen foer Teknisk Utveckling, Stockholm (Sweden).
Utilization of Waste Heat by Absorption Processes.
L. Ljung. Jun 80, 59p STU-79-5314
In Swedish.Portions of document are illegible.
U.S. Sales Only.

The report describes the principles of absorption processes and chemical heat pumps. Some suggestions for adapting absorption processes to the application of waste heat are presented. Comparison is made between absorption processes and conventional processes. The absorption processes are found to be more complex than the conventional ones and their benefit seems doubtful when applied to heat pumping or refrigerating. They appear to their advantage when used for heat transfer and heat storage. (ERA citation 07:044071)

DE82900795 MF **A01**
National Swedish Inst. for Building Research, Stockholm.
Energy from Lake and Sea Sediment - a Pilot Study.
T. Svensson, E. Degerman, B. Jansson, and S. Westerlund. Dec 79, 207p FBR-R-76-1980
In Swedish.
U.S. Sales Only. Available in microfiche only.

The possibilities to use lake and sea sediments as sources for heat pumps are investigated. Technical, geological and ecological aspects are discussed, as well as legal problems in exploiting this heat sources. Short descriptions of a few existing and planned installations are given. (ERA citation 07:043982)

DE82902085 PC **A07**/MF **A01**
TPI, Inc., Beltsville, MD.
National Solar Heating and Cooling Programme Overviews.
Dec 81, 131p CONF-810865-Pt.1
Solar world forum, Brighton, UK, 23 Aug 1981, Portions of document are illegible.
U.S. Sales Only.

The papers on the national programs of thirteen IEA member countries are included. Also included is a summary of the open discussion dealing with the effectiveness and impact of government solar heating and cooling programs. A separate abstract was prepared for each paper.

DE82903145 PC **A05**/MF **A01**
SRI International, Menlo Park, CA.
Review of Thawtron Device for Thawing Frozen Coal. Final Report.
W. A. Edson, and G. E. Tallmadge. Mar 82, 87p
EPRI-CS-2253
Portions of document are illegible.

This report considers the use of microwave energy to thaw frozen coal and focuses on the THAWTRON device, which has been proposed for this purpose. Microwave and thermal properties of coal and other materials are reviewed as a guide to the feasibility of the proposed method. Microwave thawing is compared with mechanical devices, radiant heaters, and freeze conditioning agents as an aid to unloading cars of frozen coal. It is concluded that development of a full size THAWTRON device involves high technical risk and that microwaves are unlikely to be cost effective in comparison to other available techniques for unloading frozen coal. (ERA citation 07:042205)

DOE/CS/31522-T2 PC **A07**/MF **A01**
Stanford Univ., CA.
Solar Space- and Water-Heating System at Stanford University. Final Report.
May 80, 143p
Contract AB03-77CS31522
Portions of document are illegible.

Application of an active hydronic domestic hot water and space heating solar system for the Central Food Services Building is discussed. The closed-loop drain-back system is described as offering dependability of gravity drain-back freeze protection, low maintenance, minimal costs, and simplicity. The system features an 840 square-foot collector and storage capacity of 1550 gallons. The acceptance testing and the predicted system performance data are briefly described. Solar performance calculations were performed using a computer design program (FCHART). Bidding, costs, and economics of the system are reviewed. Problems are discussed and solutions and recommendations given. An operation and maintenance manual is given in Appendix A, and Appendix B presents As-built Drawings. (ERA citation 81:025334)

N82-27545/4 PC **A05**/MF **A01**
Ruetgerswerke A.G., Frankfurt am Main (Germany, F.R.).
Solar Equipment System Packages for Old and New Buildings to Provide Domestic Water and Partial Heating.
Final Report.
G. Berg, and F. J. Mueller. Mar 82, 87p BMFT-FB-T-82-029, ISSN-0340-7608
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

Technically optimized and economically marketable system packages were investigated. Commercially available flat roof collectors failed long term (2 yr) tests. Architecturally, it is difficult to integrate the collectors into roof or wall surfaces due to their box design. Satisfactory integration is only achieved by including collectors in new building plans. Alternatively, a highly efficient plastic collector with long service life was developed. Although initial expenditure with conventional building construction is high, an improved cost-benefit relation is obtained, incorporating the flexible mat-shaped plastic absorber with fully wetted surface which is operated at pressure below atmospheric. Pilot plant results with a bivalent heat pump system prove collector capability. Design data for the absorber circuit and heat pump system are given.

PB82-141474 PC**$175.00**
California Univ., Berkeley. Lawrence Berkeley Lab.
DOE-2 BDL Summary, User's Guide (Volume 1) and DOE-2 BDL Summary, Version 2.1A, User's Guide Errata and Addenda; DOE-2 Sample Run Book (Volume 2); DOE-2 Reference Manual, Part 1 (Volume 3) and Version 2.1A Replacement; DOE-2 Reference Manual, Part 2 (Volume 4) and Version 2.1A Addenda.
May 81, 3188p LBL-8688-REV-2
Contract W-7405-eng-48
Supersedes PB80-148380. Document in binders and boxed. Prepared in cooperation with Los Alamos Scientific Lab., NM.

DOE-2 is capable of rapid and detailed analysis of energy consumption in buildings. A new user-oriented input language, the building design language (BDL), has been written to allow simplified manipulation of the many variables used to describe a building and its operation. The program manual provides the user with information necessary to understand in detail the DOE-2 program. It contains a summary of the equations and algorithms used to perform the calculations, as well as flow charts to describe how each program operates. The operation, structure, and logical sequence of calculations is described in a step-by-step manner for each of the major computational programs. The manual describes the following subprograms: (1) A BDL processor (2) A loads analysis subprogram (3) A heating, ventilating, and air-conditioning (HVAC) systems analysis subprogram (4) A plant equipment subprogram (5) An economic analysis subprogram (6) Two report subprogram (7) A set of weather analysis subprogram.

PB82-141482 PC**$40.00**
California Univ., Berkeley. Lawrence Berkeley Lab.
DOE-2 BDL Summary, Version 2.1A;User's Guide, Errata and Addenda, Version 2.1A; Reference Manual, Part 1, Replacement, Version 2.1A; Reference Manual, Part 2, Addenda, Version 2.1A.
May 81, 1071p LBL-8688-REV-2
Contract W-7405-eng-48
This update package can only be used in conjunction with PB80-148380. Complete package is available as PB82-141474. Prepared in cooperation with Los Alamos Scientific Lab., NM.

These are the errata and addenda to the users guide for the DOE-2 computer program. DOE-2 is capable of rapid and detailed analysis of energy consumption in buildings. A new user-oriented input language, the

building design language (BDL), has been written to allow simplified manipulation of the many variables used to describe a building and its operation. The program manual provides the user with information necessary to understand in detail the DOE-2 program. It contains a summary of the equations and algorithms used to perform the calculations, as well as flow charts to describe how each program operates. The operation, structure, and logical sequence of calculations is described in a step-by-step manner for each of the major computational programs. The manual describes the following subprograms: (1) A BDL processor (2) A loads analysis subprogram (3) A heating, ventilating, and air-conditioning (HVAC) systems analysis subprogram (4) A plant equipment subprogram (5) An economic analysis subprogram (6) Two report subprogram (7) A set of weather analysis subprogram.

PB82-254590 PC **A04**/MF **A01**
Columbia Gas System Service Corp., Columbus, OH.
Research, Development and Demonstration of an Advanced Actuated Heat Pump.
Annual rept. Oct 80-Sep 81,
F. B. Cook, A. R. Montero, and E. M. Purvis, Jr. 2 Apr 82, 58p GRI-80/0137
Contract GRI-5080-341-0344

The objective of Phase I is the research, development and demonstration of the basic heat pump refrigeration circuit and the heat exchange interface with the controlled and ambient environments in both cooling and heating modes of operation. The target performance characteristics for the heat pump system are a site energy COP of 0.80 for cooling and 1.50 for heating (including parasitic power consumption) at outdoor design temperatures of 95F and 47F, respectively. The basic refrigeration circuit uses a high efficiency absorption process with a novel absorbent/refrigerant pair. During the first year of this program a full sized breadboard model of the refrigeration cycle was designed and fabricated. A test program is underway. Preliminary tests indicate a cooling COP of 0.6 and a heating COP of 1.4 at design conditions, excluding electrical parasitics. In addition to the basic cycle development and test program, four hardware development and four supporting data development subcontract programs are underway. Hardware development includes interface heat exchangers, recuperative heat exchangers, a solution pump and an automatic control system. Supporting data being developed include extension of solution transport property data, corrosion control, human health assurance, and an initial market analysis.

PB82-254640 PC **A12**/MF **A01**
Mechanical Technology, Inc., Latham, NY.
Rankine/Rankine Cycle Gas-Fired Heat Pump.
Final rept. Mar 79-Mar 82,
Emil Enbar, and Robert Moriarty. 30 Jun 82, 267p MTI-82TR-3, GRI-82/0014
Sponsored in part by New York State Energy Research and Development Authority, Albany.

A Rankine/Rankine cycle gas-fired heat pump was developed for residential application. The system consists of two rotating elements: a high-speed turbomachine core and a low-speed assembly, which includes a rotating vapor generator and heat exchangers. Inherent in the rotation of these components is the elimination of separate pumps, fans, reversing valves, and expansion valves. One Rankine cycle, the power cycle, drives the turbine and gives up its excess heat to the service air. The second Rankine cycle, the refrigerant cycle, is pressurized by a turbine-powered centrifugal compressor. The dual-cycle system uses two organic heat transfer fluids. The power cycle uses a developmental, moderate-temperature fluid (designated Fluid B), and the refrigeration cycle uses Freon R-113. These two fluids are compatible and missible in each other. Therefore, positive seals are not required. A laboratory prototype model was developed to the point of initiating proof-of-concept demonstration. A conceptual design study of an end-product model was conducted, and a product specification for a family of heat pump systems with various performance enhancement options was generated. The maximum realizable performance end-product heat pump system has a projected overall coefficient of performance (OCOP) of 0.79 at 37,500 Btu/hr cooling and an OCOP of 1.49 at 60,000 Btu/hr heating load. This end-product model has an estimated manufacturing cost of $1460 (in 1982 dollars) and could be available as a commercial product in the early 1990s.

PB82-255159 PC **A03**/MF **A01**
Fraunhofer-Gesellschaft zur Foerderung der Angewandten Forschung e.V., Stuttgart (Germany, F.R.). Inst. fuer Bauphysik.
Heat Energy Consumption and Intermittent Heating,
Norbert Koenig, and Christian Kupke. Aug 82, 49p BMFT-FB-T-80-072
Trans. of unidentified German mono., Aug 80. See also N81-24589.

A quantitative assessment of the possible reduction in space heating energy consumption when using an intermitient heating mode as compared to a continuous heating mode is offered. In situ measurement methods used in rooms with different heat storage capacity and different heating systems or heating appliances are described. A variation on energy consumption is presented. A comparison of experiment with calculations indicates that in an ordinary residence an energy savings of 10 to 35 percent can be achieved by employing an intermittent heating mode, depending on the type of wall construction and the number of hours various rooms are in use. Moreover, for the heating of offices and factories, the use of electronic control systems can lead to savings of 50 percent in heat energy consumption.

PB82-255209 PC **A03**/MF **A01**
Fachhochschule Esslingen (Germany, F.R.).
Solar Energy Plant as a Complement to a Conventional Heating System - Measurement of the Storage and Consumption of Solar Energy.
Final rept. Oct 1 77-30 Sep 78,
E. Doering, and W. Lippe. Aug 82, 49p BMFT-FB-T-80-079
Trans. of mono. Solarenergieanlage zur Engaenzung einer konventionellen Heizung - Messung der Einspeicherung und des Verbrauchs von solarer Waermeenergie, n.p., Sep 80. See also N81-24590.

The technical and economic performances of a complementary solar heating installation for a new swimming pool added to a two-floor dwelling were examined after measurements were taken over a period of 12 months and analyzed. In particular, the heat absorption and utilization were measured and modifications were carried out to improve pipe insulation and regulation of mixer valve motor running and volume flow. The collector system efficiency was evaluated at 15.4%, the proportion of solar energy of the total consumption being 6.1%. The solar plant and the measuring instruments are described and recommendations are made for improved design and performance, including enlargement of the collector surface area, further modification of the regulation system, utilization of temperature stratification in the storage tanks and avoiding mutual overshadowing of the collectors.

PB82-262569 PC **A05**/MF **A01**
Thermo Electron Corp., Waltham, MA.
Open-Cycle Vapor Compression Heat Pump.
Annual progress rept.,
F. E. Becker, and A. E. Ruggles. 1981, 81p TE4224-239-82, GRI-81/0059
Contract GRI-5011-342-009
See also PB82-110503.

A prototype gas-fired steam heat pump has been developed. The system utilizes a dry screw compressor driven by a 500-hp natural gas industrial engine. The system can recompress 10,000 lb/hr of clean steam over a 3 to 1 pressure ratio. The fuel consumption of this system is approximately 50 percent that of a direct-fired boiler. A similar size system capable of operating with contaminated steam is also being developed.

PB82-873837 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Vacuum Furnaces. 1970-August, 1982 (Citations from the NTIS Data Base).
Rept. for 1970-Aug 82.
Aug 82, 113p
Supersedes PB82-854423.

This bibliography contains citations concerning vacuum furnaces, and techniques and equipment associated with the vacuum brazing and welding of refractory metals. Equipment discussed includes thermocouple positioning and automated directional solidification systems. The applications of vacuum furnaces to the forming of thin metal films of high purity are presented. (This updated bibliography contains 90 citations, 14 of which are new entries to the previous edition.)

PB82-873993 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Fluorescent Lamps and Lighting Systems. 1975-August, 1982 (Citations from the International Information Service for the Physics and Engineering Communities Data Base).
Rept. for 1975-Aug 82.
Aug 82, 279p
Supersedes PB81-880742.

This bibliography contains citations concerning fluorescent lamp and fluorescent lighting system technology. Design, development, manufacture, and applications are presented. Characteristics, performance evaluations, energy efficiency, controls, materials, trends and innovations are also discussed. (This updated bibliography contains 323 citations, 23 of which are new entries to the previous edition.)

PB82-874025 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Induction Heating. 1970-August, 1982 (Citations from the NTIS Data Base).
Rept. for 1970-Aug 82.
Aug 82, 150p
Supersedes PB82-854746.

This bibliography contains citations concerning the principles, characteristics, techniques, and applications of induction heating systems, and design and manufacturing of its components. Applications cover heat treatment, metal working, melting, and bonding in industry. Included also are effects of induction heating on physical properties of materials treated. (This updated bibliography contains 123 citations, 11 of which are new entries to the previous edition.)

13B. Civil Engineering

AD-A117 562/9 PC **A05**/MF **A01**
Atlantic Research Corp., Alexandria, VA.
Engineering and Development Support of General Decon Technology for the U.S. Army's Installation Restoration Program. Task 1. Literature Review on Ground Water Containment and Diversion Barriers.
Final rept. Jun-Oct 80,
Suzette Sommerer, and Judith F. Kitchens. Apr 82, 98p Rept no. 49-5002-01B-0001
Contract DAAK11-80-C-0027
See also Task 1 dated Feb 82, AD-A117 563.

This report presents a review and evaluation of the available information on the use of physical and hydrological barriers for containment or diversion of ground water. The types of barriers investigated included slurry-trenches, grout curtains, Imper-walls, sheet piling, French drains, wellpoints and pump-back wells. The state-of-the-art technology for each of these barriers is dicussed. Advantages and disadvantages of each method, application to particular ground water control scenarios, and costs for a standard 1067 m barrier are presented. (Author)

AD-A117 563/7 PC **A04**/MF **A01**
Atlantic Research Corp., Alexandria, VA.
Engineering and Development Support of General Decon Technology for the U.S. Army's Installation Restoration Program. Task 1. Literature Review on Landfill or Lagoon Bottom Sealing.
Final rept. Jun-Nov 80,
Judith F. Kitchens. Feb 82, 64p Rept no. 49-5002-01C-0001
Contract DAAK11-80-C-0027
See also Task 2, AD-A117 564.

This report presents a review and evaluation of the available information on techniques for bottom sealing an existing lagoon or landfill. Several bottom sealing techniques were evaluated including grouting with directional drilling, directionally controlled horizontal drilling and vertical drilling; hydraulic fracturing and grouting; pancake slurry jetting; floating a bentonite liner; and floating a synthetic liner. The advantages

and limitations of each method and costs are presented for application of each technique to a standard lagoon scenario. (Author)

AD-A117 566/0 PC **A04**/MF **A01**
Atlantic Research Corp., Alexandria, VA.
Engineering and Development Support of General Decon Technology for the U.S. Army's Installation Restoration Program. Task 7. Literature Search & Evaluation of Compatibility Testing of Waste Containment Barrier Materials.
Final rept. Jun 80-Mar 81,
Debra A. Price, and Suzette Sommerer. Mar 82, 73p
Rept no. 49-5002-07-0001
Contract DAAK11-80-C-0027
See also Task 1, AD-A117 562.

The objective of this study was to review and evaluate information on compatibility and compatibility testing of liner/barrier materials with hazardous wastes. The emphasis of the study was on methods of long-term and accelerated compatibility testing and models to predict liner compatibility with various wastes. Very little information is available on long-term compatibility with various lining materials. Essentially no methods are available for predicting membrane liner compatibility with hazardous wastes.

AD-A117 592/6 PC **A03**/MF **A01**
Army Armament Research and Development Command, Dover, NJ. Large Caliber Weapon Systems Lab.
Charcoal Regeneration - Part III. Mechanism of RDX Adsorption.
Technical rept.,
Jerome Haberman, and Thomas C. Castorina. Apr 82, 39p ARLCD-TR-82002-PT-3, SBI-AD-E400 816
See also Part 1, AD-A048 757.

Cyclotrimethylenetrinitramine (RDX) adsorption and solvent desorption cycling of activated carbon (FS300) have been studied as a function of various pretreatments. As with a previous TNT study, preferential plugging of pores by pretreatments did not enhance the regeneration of the FS300. Using water adsorption/desorption isotherms, the characteristics of a carbon with improved cycling properties has been elucidated. These properties are in agreement with those characteristics previously found in the study with TNT and are based to a shift to a larger pore volume, increased numbers of pore body diameters in the mesopore range, and an increase in the ratio of pore opening to pore diameter. The mechanism of RDX adsorption on FS300 has been elucidated and compared to that of TNT.

AD-A117 628/8 PC **A03**/MF **A01**
Flood Loss Reduction Associates, Palo Alto, CA.
Emergency Planning for Dams: Bibliography and Abstracts of Selected Publications,
H. James Owen, and A. D. Feldman. Jan 82, 34p
Contract DAWC05-80-C-0101
Supplement to AD-A102 193.

This document provides a bibliography and abstracts of selected publications relevant to emergency planning for dams (in the event of failure and large floods) and the preparation of evacuation plans. The abstracts provide an introduction to emergency planning for dams and illustrate a large number of considerations which enter into planning and the high level of technical sophistication required for dealing with some aspects. This information can assist planners in avoiding omission of important considerations in the preparation of such flood emergency plans. The abstracts and bibliography also provides assistance in identifying other publications of use in those studies. The abstracts include most of the references given in the Federal Guidelines for Dam Safety publication.

AD-A117 658/5 PC **A04**/MF **A01**
Hydrologic Engineering Center, Davis, CA.
Analytical Instruments for Formulating and Evaluating Nonstructural Measures.
Training document,
Mike Burnham. Jan 82, 58p Rept no. HEC-TRAINING-16

The document provides an annotated and illustrated summary of analytical aids, developed by the HEC, that have utility in formulating and evaluating nonstructural flood loss reduction measures in the planning setting. Twelve documents and computer programs are presented. (Author)

AD-A117 670/0 PC **A05**/MF **A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS. Hydraulics Lab.
Norfork Lake, Arkansas, Temperature Analysis; Mathematical Model Investigation.
Final rept. Jan-Jun 81,
Jeffery P. Holland, Mark S. Dortch, and Dennis R. Smith. Apr 82, 81p Rept no. WES/TR/HL-82-12

The impact of a proposed hydropower modification upon the thermal structure of the Norfork Lake and upon the releases from the proposed reregulation structure was investigated with a one-dimensional numerical model. The numerical simulation model was adapted from previous analyses of pumped-storage projects (Marysville and Dickey-Lincoln School Lakes hydrothermal studies). The approach involved the selection of three study years (1974, 1975, and 1976) and simulation of lake operation for each year both with and without pumped-storage hydropower. The simulations without pumped-storage operations were compared with the existing data bases for the respective years to verify the accuracy of the simulations. Subsequently, the simulations with pumped-storage operations were compared with the simulations with conventional hydropower operations to determine the relative thermal changes both in the reservoir and the release that would have occurred with pumped-storage operations in the respective or similar years. (Author)

AD-A117 812/8 PC **A11**/MF **A01**
Hydrologic Engineering Center, Davis, CA.
Hydrologic Engineering in Planning,
Mike Burnham, Bill Johnson, and Darryl Davis. Apr 81, 241p Rept no. HEC-TRAINING-14

This manual is intended as instructive material which presents the basic purpose, concepts and methodologies of hydrologic engineering. It is organized into three main sections: Hydrograph Analysis, Fluvial Hydraulics, and Frequency analysis. Also, covered are Reservoir Yield Studies and Managing Hydrologic Studies. (Author)

AD-A117 813/6 PC **A05**/MF **A01**
Hydrologic Engineering Center, Davis, CA.
Flood Preparedness Planning: Metropolitan Phoenix Area,
Michael W. Burnham, Darryl W. Davis, Brian W. Smith, Rochelle Barkin, and Bill S. Eichert. Jan 82, 100p

The report, Flood Preparedness Planning, Metropolitan Phoenix Area, was prepared by the Hydrologic Engineering Center (HEC) for the Los Angeles District, Corps of Engineers. The Stage II level planning study investigated enhancement potentials for existing flood emergency preparedness plans. The study used on existing grid cell data bank and the DAMCAL and EAD computer programs to determine existing and modified expected annual damage values. Feasibility assessments included use of interviews, flood scenarios as well as the analytical techniques. Report findings are presented. (Author)

AD-A117 844/1 PC **A06**/MF **A01**
Flow Analysis Associates, Ithaca, NY.
A Theoretical Appraisal of the Joint Effects of Turbulence and of Langmuir Circulations on the Dispersion of Oil Spilled in the Sea.
Final rept.,
S. Leibovich, and J. L. Lumley. Sep 81, 124p FAA-8101, USCG-D-26-82
Contract DTCG23-80-C-20019

The extent to which oil spilled at sea can be dispersed by the action of oceanic turbulence and of Langmuir circulations is investigated theoretically. The bulk of the study concerns the mixing of oil, in the form of small noninteracting particles, into the water column. Computer simulations using physically derived models of turbulent dispersion and of Langmuir circulations indicate that bouyant oil particles can be suspended to depths of tens of meters under moderate environmental conditions. This is thought to explain the deep oil observed under oil slicks from the IXTOC-I incident in the Gulf of Mexico. In addition, a simple model is devised to estimate the thickness and total volume of oil collected into windrows on the water surface. (Author)

AD-A117 848/2 PC **A02**/MF **A01**
Cold Regions Research and Engineering Lab., Hanover, NH.
Evaluation of a Simple Model for Predicting Phosphorus Removal by Soils during Land Treatment of Wastewater.
Special rept.,
J. C. Ryden, J. K. Syers, and I. K. Iskandar. Jun 82, 16p Rept no. CRREL-SR-82-14

This report evaluates a simple P balance model to predict site longevity with respect to P removal during land treatment of wastewater. The model is based on measured inputs and outputs of P at the treatment site and on an estimate of the P storage capacity of the soil profile. Sorption of P by three soils used for land treatment conformed to the P sorption model based on a generalized isotherm. Laboratory sorption tests were used to predict P storage capacity of the soil profiles at a solution P concentration equivalent to that in the effluent applied to the soil. For two soil profiles the P balance model predicted site longevities of approximately 50 to 210 years. The existing depth of P enrichment in these profiles predicted from the model agreed closely with measurements of P enrichment based on amounts of NaOH-extractable P and on measured soil solution P concentrations. (Author)

AD-A117 854/0 PC **A09**/MF **A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS. Hydraulics Lab.
Pumping Performance and Turbidity Generation of Model 600/100 PNEUMA Pump. Main Text and Appendixes A and B.
Final rept. Aug-Oct 78,
Thomas W. Richardson, John E. Hite, Jr., Richard A. Shafer, and James D. Ethridge, Jr. Apr 82, 181p
Rept no. WES/TR/HL-82-8-APP-A/B
See also Appendix C, AD-A117 146.

Report describes full-scale tests of patented, air-operated solids handling device called PNEUMA pump. Pump was tested in a river channel, lock entrance, tidal inlet, and dock area in both sand and fine-grained sediment. Report describes test procedures, equipment, instrumentation, and data reduction. Results are evaluated in terms of pumping performance and turbidity generated in fine-grained sediment. Pump could dredge in situ densities in fine-grained sediment but could not in sand. Difficulty was experienced in sustaining high discharge densities. Power efficiencies of pump were low. No significant turbidity was measured when dredging fine-grained sediment. Appendix A gives graphical presentation of performance parameters for each test run. Appendix B presents tables of measured turbidity values. Appendix C (bound separately) contains tables of measured data and calculated parameters interpolated at 9-sec intervals for each test run. (Author)

AD-A117 878/9 PC **A05**/MF **A01**
Scientific Service, Inc., Redwood City, CA.
Hazardous Materials Incidents: An Investigation.
Jul 82, 80p Rept no. 8043-10
Contract EMW-C-0432
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

This report presents the information developed under Task 3 of Federal Emergency Management Agency Contract EMW-C-0432. The overall purpose of this contract was to provide 'Supporting Management Information System and Data Collection Instrument for Hazardous Materials Research'. The results of Task 1 - The development of a decision information system and data collection protocol comprehensive management approach to hazardous materials, and Task 2 - The development of an approach, with prototype editions, of a hazardous materials information exchange medium, were presented in a final report entitled 'An Approach to the Management of Hazardous Materials', which was published in September 1981.

DE82003020 PC **A03**/MF **A01**
Bechtel Group, Inc., San Francisco, CA.
Testing of Sodium Thiosulfate as an Oxidation Inhibitor in a Limestone FGD Scrubber at the DOE Shawnee Test Facility.
S. C. Wang, D. A. Burbank, D. T. Rabb, H. K. Patel, and D. P. McGrath. Oct 81, 31p DOE/MC/16427-T1
Contract AC21-81MC16427
Portions of document are illegible.

A total of four limestone runs were made on the 10-MW spray tower system from April 10 through May 30, 1981, including two base case runs without thiosulfate (Runs SST 102 and SST 101) and two runs with thio-

sulfate addition (Run SST 106 and SST 112). With an inlet SO sub 2 concentration of 1500 to 2300 ppM, a scrubber inlet pH of 5.3, and a slurry solids concentration of about 3.5% (Runs SST 101, SST 106, and SST 112), the addition of S sub 2 O sub 3 /sup =/ in the form of sodium thiosulfate pentahydrate (Na sub 2 S sub 2 O sub 3 .5H sub 2 O) resulted in gypsum descaling mode of operation. At 7.6 lbs/h addition rate of Na sub 2 S sub 2 O sub 3 .5H sub 2 O during Run SST 106, the S sub 2 O sub 3 /sup =/ concentration appeared to remain constant at about 90 ppM (10 to 200 ppM range), and the spray tower operated under slightly descaling mode. The S sub 2 O sub 3 /sup =/ concentration was questionable for this run because of analytical problems. At 15.2 lbs/h addition rate of Na sub 2 S sub 2 O sub 3 .5H sub 2 O during Run SST 112, the S sub 2 O sub 3 /sup =/ concentration continued to increase and appeared to level off at 2200 ppM toward the end of the run after 214 operating hours. Gypsum saturation in the scrubber inlet liquor decreased to about 10% at the end of the run, and the scrubber operated under highly descaling mode. (ERA citation 07:045602)

DE82007244 PC **A03**/MF **A01**
California Univ., Berkeley.
Semiannual Report.
C. L. Strojan. 1977, 29p DOE/SF/00012-T14
Contract AC03-76SF00012
Portions of this report are illegible.

To understand the dynamics of trace metals in desert environments requires estimates of compartment concentrations or storages (i.e., amounts of elements in soils, plants and animals), determinations of rates of flow between compartments, and estimates of rates at which materials are introduced into and irreversibly lost from the system. This report deals with measurements of amounts of trace elements in the environment surrounding Southern California Edison's Mohave Generating Station in southern Nevada, a collaborative study with Los Alamos Scientific Laboratory of trace elements in the vicinity of the Four Corners Power Plant in New Mexico, and laboratory and field experiments related to cycling of trace elements. (ERA citation 07:051510)

DE82009921 MF **A01**
Brookhaven National Lab., Upton, NY.
National Assessment of the Air Quality Impacts of Residential Firewood Use.
F. W. Lipfert. 1982, 14p BNL-30993, CONF-820353-1
Contract AC02-76CH00016
Speciality meeting on residential wood and coal combustion, Louisville, KY, USA, 1 Mar 1982, Portions of document are illegible.
Available in microfiche only.

This paper is an outgrowth of firewood studies at Brookhaven National Laboratory that began under the Department of Energy's Technology Assessment of Solar Energy Systems. These studies include a methodology to project firewood usage at the county level throughout the nation, verification of this algorithm at the state level, and estimates of national air pollution burdens. This paper extends the analysis to detailed consideration of ambient air quality impacts in six northern US cities, using a new area source dispersion model.

DE82010727 MF **A01**
Lawrence Livermore National Lab., CA.
Predicting the Hazards from Large Spills of Liquefied Gaseous Fuels.
W. J. Hogan, D. L. Ermak, and R. P. Koopman. Nov 81, 26p UCRL-86164, CONF-820416-1
Contract W-7405-ENG-48
Hazardous material spill conference, Milwaukee, WI, USA, 19 Apr 1982, Portions of this report are illegible. Best available copy from document source. Available in microfiche only.

With the increase in volume of liquefied gaseous fuels (LGFs) being transported and stored throughout the world, there comes a growing possibility of very large spills of flammable materials. The LGF Spill Effects Program was established at Lawrence Livermore National Laboratory (LLNL) by the Department of Energy (DOE) to develop and validate tools that can be used to predict the effects of a large LGF spill - including pool spread, vaporization, dispersion, ignition, combustion, explosion, and damage effects. (ERA citation 07:045756)

DE82011313 MF **A01**
Institute of Gas Technology, Chicago, IL.
Preparation of a Coal-Conversion-Systems Technical Data Book. Final Report, May 1, 1976-October 31, 1980.
Feb 82, 373p DOE/ET/10255-3
Contract AC01-76ET10255
Portions of document are illegible.
Microfiche copies only.

The data reported by van Krevelen and co-workers and those of Miles and Wilson on the NH sub 3 -H sub 2 S-H sub 2 O system were analyzed using Meissner's treatment of ionic activity coefficients. Meissner's method is more easily adaptable to the quaternary (NH sub 3 -CO sub 2 -H sub 2 S-H sub 2 O) system or to mixtures containing still more electrolytes, such as chloride and cyanide, than our previous approach. Vapor-liquid equilibrium (VLE) data for 8 binary systems, consisting of light gas and pure, coal liquid components, are presented in a convenient-to-use form. We have also presented VLE data on a multicomponent system consisting of methane, ethane, propane, toluene, and 1-methylnaphthalene. Thermodynamic properties of toluene are presented in a new convenient-to-use steam table format in both SI and English units. Free energies of formation are tabulated for a number of trace metal compounds expected to be formed in coal conversion systems. Data are presented for a 75 exp 0 to 2000 exp 0 F temperature range for most of the compounds. Information is presented for gas/solids separation equipment. Principles of operation, equipment description, performance, and process information are given for electrostatic precipitators, baghouses, cyclones, granular-bed filters, and wet scrubbers. The gaseous, liquid, and solid effluents generated by both the atmospheric and pressurized fluidized-bed combustion process are described. The range of corrosion rates obtained in simulated coal gasification atmospheres (CGA) in laboratory tests for a number of promising alloys is tabulated. The chemical compositions of the alloys tested are also given. (ERA citation 07:045495)

DE82012202 MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Geothermal Deicing of Highways and Bridge Structures.
I. A. Engen. Feb 82, 14p EGG-GTH-5739
Contract AC07-76ID01570
Available in microfiche only.

Preliminary cost estimates prepared for the Colorado Department of Highways regarding deicing of highways and bridge structures are presented. (ERA citation 07:043173)

DE82012244 PC **A04**/MF **A01**
Westinghouse Research and Development Center, Pittsburgh, PA.
Evaluation of Gasification and Gas-Cleanup Processes for Use in Molten-Carbonate Fuel-Cell Power Plants. Quarterly Technical Progress Report No. 3, October-December 1981.
1981, 53p DOE/MC/16220-T3
Contract AC21-81MC16220

The Task A Topical Report, which provides process information definition of coal gasification and coal gas cleanup systems, is in the process of being printed. The Task B interim report is complete and is being typed for issue in January. This report provides a choice of the gasifier/cleanup system combinations most suitable for MCFC-based power plant application. Included are hot gas cleanup, air-blown, oxygen-blown and molten salt based coal gas supply systems which consider, where applicable, a Texaco and a British Gas Council/Lurgi Slagging system for comparison with previously published EPRI, UTC and GE work. This Quarterly Technical Progress report (No. 3) provides a complete review of particulate tolerance of the fuel (anode) side of MCFC units. This evaluation, which was formally authorized by DOE/METC in October, provides an assessment of deposition for power plant size molten carbonate fuel cells and describes mechanisms affecting particle transfer in fuel cells. The assessment concludes that gas cleanup to remove virtually all particles larger than one micron in diameter is expected to prevent, or at least minimize to a negligibly low level, deposition of particulate material on the anode. However, cathode particulate deposition in molten carbonate fuel cells should be evaluated in the future, since cathodes are more likely to experience deposition even though cathode channel particle concentrations can be much lower than anode channel concentrations. Cathodes are more susceptible to deposition than anodes due to a net mass flow of gases into cathode pores compared to a net mass flow of gases out from anode pores. (ERA citation 07:042042)

DE82012251 PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Fate of Corrosion Products Released from Stainless Steel in Marine Sediments and Seawater. Part 1. Northeast Pacific Pelagic Red Clay.
R. L. Schmidt. Mar 82, 45p PNL-3466-Pt.1
Contract AC06-76RL01830

To provide information useful for determining the biogeochemical cycling of corrosion products in the benthic boundary layer of the deep ocean, neutron-activated stainless steel was exposed to seawater and to Northeast Pacific red clay under aerobic and non-oxygenated conditions. This report describes the trace metal geochemistry of the sediment and the chemical speciation of the corrosion products. The sediments generally consisted of reddish-brown clay at the surface grading to a dark-brown transition zone below which mottled olive-gray clay prevailed. Neutron-irradiated 347 stainless steel specimens were exposed to seawater and sediment slurry under aerobic and non-oxygenated conditions for 108 days. The presence of aerated sediment more than doubled the amount of corrosion products released compared to aerated seawater and non-oxygenated sediment treatments. The distribution of exp 60 Co released from the stainless steel exposed to aerated seawater show that almost 70% of exp 60 Co activity became associated with suspended particulate matter. No detectable exp 60 Co activity was present in the soluble, readily dissolved, or inorganic or weakly complexed fractions of aerated sediment which had been used to treat neutron-activated stainless steel. Almost 50% of the exp 60 Co activity was extracted in the combined soluble, easily dissolved, adsorbed, and organically complexed fractions from the non-oxygenated sediment treatment indicating that this much of the corrosion products may be initially released in ionic form.

DE82012286 PC **A05**/MF **A01**
National Center for Resource Recovery, Inc., Washington, DC.
Model Contract for a Full-Service Resource Recovery Program.
J. F. Bernheisel. Mar 82, 80p DOE/CS/20167-14
Contract AC01-76CS20167

A model contract for procuring a resource recovery facility to produce refuse-derived fuels and recovery materials is presented. The contract is designed to be used by a local government entity. The form of the contract contains information on the following: design and construction of the facility; operation of the facility and the landfill; research, development, and test and evaluation projects; proprietary processes; rights in data; facility sale, removal, and termination limitations; compensation and profit sharing; obligations of the corporation and the city; indemnities and insurance; force majeure; and default.

DE82012602 PC **A05**/MF **A01**
Lawrence Livermore National Lab., CA.
FDAS Hardware and Firmware Description, Liquefied Gaseous Fuels (LGF) Data-Acquisition System.
J. Baker. Mar 82, 87p UCID-19348
Contract W-7405-ENG-48
Microfiche only after original copies are exhausted.

The FDAS are the front-end data acquisition units of the Liquefied Gaseous Fuels Data Acquisition System (LGFDAS). They acquired data from numerous sensors during liquefied natural gas (LNG) dispersion and vapor burn experiments conducted at the Naval Weapons Center, China Lake, California, in 1980 and 1981. This is a description of the hardware, functions, commands, messages, and firmware of the FDAS units. (ERA citation 07:042344)

DE82013309 PC **A04**/MF **A01**
Department of Energy, Washington, DC. Office of Policy, Planning and Analysis.
Costs to Reduce Sulfur Dioxide Emissions.
Mar 82, 62p DOE/PE-0042

Central to the resolution of the acid rain issue are debates about the costs and benefits of controlling man-made emissions of chemicals that may cause acid

rain. In this briefing, the position of those who are calling for immediate action and implicating coal-fired powerplants as the cause of the problem is examined. The costs of controlling sulfur dioxide emissions using alternative control methods available today are presented. No attempt is made to calculate the benefits of reducing these emissions since insufficient information is available to provide even a rough estimate. Information is presented in two steps. First, costs are presented as obtained through straightforward calculations based upon simplifying but realistic assumptions. Next, the costs of sulfur dioxide control obtained through several large-scale analyses are presented, and these results are compared with those obtained through the first method. (ERA citation 07:044757)

DE82900792 MF **A01**
Swedish Water and Air Pollution Research Lab., Goeteborg.
Downdraught of Heavy Metals in the Region of Hagfors.
L. Skaerby. Oct 80, 33p IVL-B-553
In Swedish.Portions of document are illegible.
U.S. Sales Only. Available in microfiche only.

The land pollution by heavy metals round Hagfors steelworks, Sweden has been investigated by means of wall-moss (Pleurozium schreberi). Increasing amounts of iron, nickel and cobalt have been detected. A distinct gradient was found in the northeast direction for all the metals except manganese and cadmium. The contents of metals in the moss were not alarmingly high when compared with the background of the area. (ERA citation 07:044681)

DE82901842 MF **A01**
Electric Power Research Inst., Palo Alto, CA.
Proceedings: First Conference on Fabric-Filter Technology for Coal-Fired Power Plants.
Feb 82, 487p EPRI-CS-2238, CONF-810790-
Conference on fabric filter technology for coal-fired power plants, Denver, CO, USA, 15 Jul 1981, Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

Eighteen papers were presented at the meeting. A separate abstract was prepared for each paper. (ERA citation 07:043270)

DE82901850 PC **A04**/MF **A01**
KVB, Inc., Irvine, CA.
Assessment of the Legislative and Regulatory Environment: NO/Sub X/ Case Studies.
M. J. Berlant. Feb 82, 54p EPRI-EA-2063
Portions of this report are illegible.

This report is intended to supplement EPRI Final Report EA-2048, Volume 2, entitled Control of Nitrogen Oxides: Assessment of Needs and Options, Technical Support Document - Volume 2: Legislative and Regulatory Environment. EPRI EA-2048 is a six-volume set designed to provide utilities with information needed to contend with several pending NO/sub x/-related regulatory changes. Six actual case studies that illustrate many of the NO/sub x/-related regulatory issues which can impact fossil-fuel power plants are presented. The case studies are projects undertaken in California and focus on the emissions and control of NO/sub x/. Specific topics covered include siting considerations in nonattainment and prevention of significant deterioration areas, the process of acquiring and applying emissions offsets, the choice of NO/sub x/ control technologies, and interactions among the various regulatory agencies. (ERA citation 07:051445)

DE82901862 MF **A01**
Systems Applications, Inc., San Rafael, CA.
Survey of Plume Models for Atmospheric Application.
M. K. Liu, G. E. Moore, and H. Y. Holman. Feb 82, 146p EPRI-EA-224
Portions of this report are illegible.
Available in microfiche only.

This study was carried out as part of an effort to evaluate existing atmospheric plume models designed to estimate air quality impacts from elevated point sources and to select a few representative models from numerous plume models currently available. On the basis of a set of criteria dictating the specific needs of the utility industry, 30 existing plume models, consisting of 19 kinematic models, 9 first-order-closure models, and 2 second-order-closure models were identified and analyzed. The model formulation and the technical attributes of each of the 30 plume models is compared and examined for differences and similarities. When appropriate, the operational and legal status of each of the plume models are also discussed. This information then provided the basis for the selection of a subset of plume models for further analysis or application. Four Gaussian plume models, three first-order-closure models and one second-order-closure model have been selected for extensive operational and diagnostic validation using the comprehensive data bases which are being assembled under the Plume Model Validation project. (ERA citation 07:051444)

DE82902266 MF **A01**
Tennessee Valley Authority, Muscle Shoals, AL. Office of Natural Resources.
Analysis of Sulfur-Dioxide Excesses in the Widows Creek Steam Plant Area During September 1981.
K. G. Wastrack. Jan 82, 51p TVA/ONR/ARP-82/10
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

During September 1981, sulfur dioxide (SO sub 2) levels in excess of the National Ambient Air Quality Standards (NAAQS) were measured at monitoring station 11 in the vicinity of Widows Creek Steam Plant. SO sub 2 concentrations exceeding the 3-hour secondary standard of 0.50 parts per million (ppM) were measured on two occasions, producing one violation of the standard. This report examines the physical and environmental circumstances associated with these excess measurements, documents the circumstances, and determines the sources which may have contributed to the excess measurements. Data bases in this investigation include: TVA meteorological and air quality data from the Widows Creek montoring network, National Weather Service (NWS) data, topographic maps, and Widows Creek Steam Plant operational data. This report presents and evaluates all available data and information related to the September 1981 measurements. (ERA citation 07:044663)

DE82902543 PC **A06**/MF **A01**
Tennessee Valley Authority, Muscle Shoals, AL. Office of Natural Resources.
Atmospheric Oxidation of Flue Gases from a Partially Sulfur Dioxide-Scrubbed Power Plant. Study II.
E. M. Bailey, R. W. Garber, J. F. Meagher, R. J. Bonanno, and L. Stockburger. Nov 81, 108p TVA/ONR/ARP-82/4
Portions of document are illegible.

A series of 12 airborne plume sampling experiments was conducted in the Widows Creek Steam Plant plume. The principal purpose of these experiments was to investigate the atmospheric chemistry of the plume from the wet limestone sulfur dioxide scrubber unit. The average sulfate formation rate determined for these experiments was approximately 1.7 percent per hour (% h exp -1). The average nitrate formation rate measured by removal of nitrogen oxides was in excess of 30% h exp -1 . Little, if any, chemical reactivity difference was observed between the partially scrubbed plume and the totally unscrubbed plume. The data from these measurements indicate the possibility of a strong influence from solar radiation on the atmospheric chemistry. On one day of this study, net ozone production was observed in the plume. This ozone formation in the plume was attributed to the mixing of the power plant plume with a highly polluted air mass possibly transported from a large metropolitan area, such as Chattanooga, Tennessee. The results agree basically with many other recent power plant plume studies and several recently developed mathematical plume simulation models. (ERA citation 07:043274)

DE82902718 PC **A08**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Projekt Prozesslenkung mit DV-Anlagen.
Application Programming of a Hierarchical Traffic Control System with the Realtime Programming PEARL.
W. Sonnenberg. Jan 81, 165p KFK-PDV-203
In German.
U.S. Sales Only.

We desribe the method of functional modularization and design by this method the hierarchical structure of a computerized traffic control system. On the base of program layouts we extract application profiles of the system modules and show the applicability of various elements of the realtime programming language PEARL. There follow detailed comments on PEARL and our experience with an implementation on the Z80-microprocessor. In the last chapter you see the design of a test system for testing realtime program at the language level of PEARL and details of its implementation. (ERA citation 07:044016)

N82-27515/7 PC **A04**/MF **A01**
Fraunhofer-Gesellschaft zur Foerderung der Angewandten Forschung e.V., Wuerzburg (Germany, F.R.). Inst. fuer Silicatforschung.
Fluorine Emission During Ceramic Firing.
Final Report.
G. Tuenker, H. Schmidt, and H. Scholze. Dec 81, 70p BMFT-FB-T-81-231, ISSN-0340-7608
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

Mechanisms of fluorine emission of clay minerals and ceramic batches were investigated in a laboratory furnace by quasi-continuous monitoring of the concentration in the flue gas. Ceramic batches are often contaminated by fluorine as an impurity in the clay and as a consequence, volatile fluorine compounds are emitted during the firing process. For thermodynamic reasons, the stability of the fluorine bond during the firing process is not high enough. Fluorine emission is strongly affected by a water vapor-containing firing atmosphere. The specimen's microstructure is very important especially with regard to mass transfer, e.g., HF and H2O, the porosity, in particular. A reduced flourine emission level is attained for many ceramic batches by optimizing the firing conditions. Another practice method is the application of glazes with a gloss firing behavior that essentially seals off the surface before the maximum flourine emission rate is reached.

N82-27685/8 PC **A08**/MF **A01**
National Mechanical Engineering Research Inst., Pretoria (South Africa).
Hydraulic Transport of Coarse Solids in Circular and Segmented Pipes.
H. B. Sauermann. May 81, 165p CSIR-ME-1716, ISBN-0-7988-1479-9

A detailed investigation into the hydraulic transport of coarse solids in circular and segmented pipes is presented. The existing hydraulic transport pipelines carry relatively fine solids. It is believed that if coarse solids could be transported economically, many more hydraulic transport pipelines would come into operation. It is shown that by providing a wide bed, e.g., a base wear plate in a circular pipe (segmented pipe) to the sliding bed of coarse particles, the energy requirements for the same solids throughout in comparison with a circular pipe of the same diameter is, depending upon the position of the base wear plate and the solid material, reduced by up to 35%.

N82-27704/7 PC **A06**/MF **A01**
Technische Univ., Berlin (Germany, F.R.). Inst. fuer Wasserbau und Wasserwirtschaft.
Investigation of the Stability of a Hydraulically Controlled Float Tank/Flap Gate Weir, Rigidly Connected by a Shaft, in a Rainwater Drainage Pipe System.
Final Report.
F. Busch. Feb 82, 120p BMFT-FB-T-82-006, ISSN-0340-7608
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

Rainwater runoff control in a mixed storm drain/sewer system was investigated. Fixed side weir outlets to a spillway were found unsatisfactory. A self-regulating float chamber/flap gate on an eccentric pivot was designed. With this type of construction, the spillway fills only in case of very heavy flooding. Lighter runoff is stored in the pipe network until it can be processed through the sewage treatment plant. Functional criteria by which this control system can be evaluated were sought. With respect to stationary boundary conditions the functional relationships between the limiting hydraulic quantities were studied theoreticaly and experimentally. Operating conditions are simulated by a numerical model in which the hydraulic quantities are assumed to be stationary within a time step. For any existing type of rainwater outlet construction, having a float chamber/flap gate system, this numerical method permits computation of the highest level of outlet, the point of equilibrium of the inflow and spilloff, the water surface, and the generating angle of the rainwater

outlet construction. As an alternative, the points of equilibrium can also be determined iteratively by using dimensioning graphs.

N82-27862/3 PC **A03**/MF **A01**
National Inst. for Water Research, Pretoria (South Africa).
NIWR Interlaboratory Comparison Study No. 80/C: Determination of Trace Metals in Sewage Sludge. Evaluation Results.
R. Smith. 1981, 38p CSIR-RR-395, ISBN-0-7988-2138-8

Trace metals, namely aluminum, cadmium, chromium, copper, iron, lead, manganese, nickel and zinc are analyzed from two samples of dried sewage sludge. The results are evaluated and discussed, along with some of the advantages and disadvantages of various sample pretreatment techniques.

N82-27863/1 PC **A02**/MF **A01**
Ontario Ministry of the Environment, Toronto.
Report on 1980 International Meeting of Noise Regulatory Officials on Alignment of Noise Test Procedures, Washington, D.C., May 1980.
J. Manuel. 1981, 16p S-258
Presented at Intern. Symp. On Transport Noise, Pretoria, 21-23 Oct. 1981.

Regulations and policies of several countries were reviewed. Emphasis is placed on the labeling of construction equipment and domestic appliances. Noise limits on motorized vehicles are discussed.

N82-27864/9 PC **A02**/MF **A01**
Ontario Ministry of the Environment, Toronto.
Transportation Noise, Its Impact, Planning and Regulation.
J. Manuel. 1981, 19p S-258
Presented at the Intern. Symp. On Transportation Noise, Pretoria, 21-23 Oct. 1981.

Examples of the effects transportation noise has on communities are provided. Recent work in noise pollution in Canada is highlighted. National policies were examined and regulations were reviewed.

N82-27994/4 PC **A10**/MF **A01**
South African Inst. of Civil Engineers, Pretoria.
Symposium on Computers in Civil Engineering.
1981, 203p ISBN-0-7988-2097-9
Sponsored in Part by the Construction Industry Computer Information Centre. Symp. Held in Pretoria, 1981.

Electronic computation in planning, management, and process control is discussed. Trends in computing are considered. Quality control in software is reviewed. Management of inhouse computer facilities is discussed. Graphics software is considered. A drafting system for highway plans is presented. Topgraphic reference surfaces are examined. Transportation systems modelling is considered. Transportation packages are reviewed. Computer methods in highway engineering are discussed. A two-dimensional finite difference hydraulic model is applied to tidal circulation and harbor resonance. The effects of disruption in contract adminstration are assessed. Computer detailing of concrete reinforcement is discussed.

N82-28108/0 PC **A03**/MF **A01**
Cape Town Univ. (South Africa).
A Heuristic Solution Procedure for a Joint Reservoir Control-Capacity Expansion Problem.
M. Sniedovich, and P. A. Nielsen. Sep 81, 26p CSIR-TWISK-218

A joint reservoir control-capacity expansion problem is considered, n which the expansion policy is required to be deterministic. Owing to the difficulty of solving this problem because the release policy is stochastic, a heuristic procedure is proposed utilizing an upper bound to the optimal deterministic solution obtained by solving a modified stochastic problem, and a simple averaging heuristic for transforming stochastic policies into deterministic policies. A simple numerical example demonstrates the overall procedure.

PAT-APPL-6-335 036 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Huntsville, AL. George C. Marshall Space Flight Center.
Method for Treating Wastewater Using Microorganisms and Vascular Aquatic Plants.
Patent Application,
B. C. Wolverton. Filed 28 Dec 81, 22p N82-25335/2, NASA-CASE-NSTL-10-1
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An invention relating to waste water treatment is described. The waste water is subjected to anaerobic settling for at least six hours, the resulting effluent passing upward through a filter cell in which the effluent is first subjected to the action of an aerobic and facultative microorganisms and then to aerobic microorganisms and the roots of a vascular aquatic plant. Details of the processes are given. The novelty of the invention resides in the combined use of microorganisms and aquatic plant roots in a filter bed. This enables removal of phosphorous, ammonia and potassium impurities which are not normally removed by bacteria alone.

PB82-191990 CP **T02**
Environmental Protection Agency, Washington, DC.
Notification of Hazardous Substance Sites (Section 103(c)).
Data file,
Barbara Jarvis, and James Kersey. Jan 82, mag tape EPA/DF-82/014
Source tape is in EBCDIC character set. Character set restricts preparation to 9 track, one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products if you have questions.

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 PL 96-510 (commonly known as Superfund) mandates in Section 103(c) that certain persons notify the U.S. Environmental Protection Agency (EPA) by June 9, 1981, of the existence of sites where hazardous substances from industries, businesses, governments, hospitals, and other sources are stored, treated, or disposed of. This magnetic tape contains records of 8664 notifications of hazardous substance sites that were reported as of the notification deadline date, (June 9, 1981). For each notification the tape summarizes the location, person required to notify, amount and type of any hazardous substance to be found, and any known or suspected releases of hazardous substances on the site reported. The notifications were compiled to help EPA and State and local governments remedy problems created by uncontrolled hazardous substance disposal. The tape is sequenced alphabetically by state and site name within each state, respectively.

PB82-240284 PC **A05**/MF **A01**
Michigan Univ., Ann Arbor. School of Natural Resources.
Impact of a Once through Cooling System on the Yellow Perch Stock in the Western Basin of Lake Erie,
A. L. Jensen, and T. A. Hamilton. Jul 82, 78p EPA-600/3-82-072

Conventional stock assessment models have been applied to determine the impact of entrainment and impingement at the Monroe Power Plant on the yellow perch stock of the western basin of Lake Erie. First the surplus production model was applied. Biological parameters of the model were estimated from commercial catch and effort data, and entrainment and impingement coefficients were estimated from power plant data. The model was used to estimate stock biomass, egg production, and larvae production; the proportions entrained and impinged were then estimated. The impact of water withdrawal on the equilibrium standing stock and maximum sustainable yield from the fishery were estimated and the impacts of increased water withdrawal were simulated. An analytical model was also applied. Parameters of the analytical model were estimated using power plant data, biological data available in the literature, and commercial catch data. The model was used to estimate the age structure and biomass of the perch stock and to estimate the impact of the power plant on abundance of the impingeable stock and biomass of the exploited stock.

PB82-242090 PC **A06**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Environmental Criteria and Assessment Office.
A Review of Air Pollutant Damage to Materials,
John E. Yocom, Alexander R. Stankunas, and F. Vandiver P. Bradow. Jun 82, 103p EPA-600/8-82-016
Prepared in cooperation with TRC Environmental Consultants, Inc., Wetherfield, CT.

Report prepared as U.S. contribution to Panel 3 of NATO Committee on Challenges of Modern Society Pilot Study on Air Pollution Control Strategies and Impact Modeling. Panel 3 focuses on air pollutant impact and will publish 4 reports on air pollutants effects; this is the first in the series and covers effects on materials. Reviewed here are physical and economic effects of sulfur oxides, particulate matter, nitrogen oxide, ozone, hydrogen sulfides, fluoride, and ammonia on metals, textiles, paint, building materials, leathers, paper and elastomers. Report is summary of pertinent information in EPA's air quality criteria and EPA-Funded NAS review documents.

PB82-248501 PC **A02**/MF **A01**
British Carbonization Research Association, Chesterfield (England).
The Biological Treatment of Coke-Oven Effluents: An Appraisal of the Rotating-Disc Process from Laboratory and Pilot-Scale Studies.
Carbonization research rept. (Final).
Apr 78, 20p CARBONIZATION/RR-47

The rotating-disc process was used successfully on the laboratory scale and monohydric phenol and thiocyanate were effectively removed at organic loadings comparable with those obtained with the activated-sludge (AS) process. It was found to be more resilient than the AS process to some types of disturbances viz. acidic influents, mechanical breakdowns and the sudden surges in hydraulic or organic load. Scaling the process up to pilot plant scale reduced its efficiency. The organic loading per unit area of the disc surface was found to be a fundamental design parameter. Increasing the disc diameter from 23 to 48 cm reduced the maximum organic loading by about a half. The process was found to be no cheaper to run than the AS process, and its higher capital cost made it less attractive economically.

PB82-248824 PC **E04**/MF **E04**
Water Research Centre, Stevenage (England).
Field Measurements of Initial Dilutions at a Sea Outfall.
Technical rept.,
R. Bettess, and D. Munro. c1981, 32p TR-161
Prepared in cooperation with Hydraulics Research Station, Wallingford (England).

An account is given of a series of field measurements of initial dilution of sewage from a sea outfall. The outlet was horizontal and discharged into a tidal current. Dilution was measured by means of a radioactive tracer added to the sewage before discharge by pumping at a controlled rate to the outfall. Samples collected from 25 positions on a 10 m square grid gave time-averaged estimates of dilution for each run. Eleven runs were carried out.

PB82-248832 PC **E08**/MF **E08**
Water Research Centre, Stevenage (England).
First Report on the WRC Sewage Sludge Pumping Project.
Technical rept.,
M. Johnson. Apr 81, 105p TR-162
Prepared in cooperation with British Hydromechanics Research Association, Cranfield (England).

This report describes experiments carried out over a two year period to investigate the effect of sewage sludge on rotodynamic pump and pipeline performance. Pump performance has been correlated with sludge rheology, and ragging up and gas bubbles within the sludge have been shown to have an adverse effect on pump performance. Pipeline friction loss prediction methods have been evaluated by comparison with observed results and recommendations regarding the most suitable procedure are made.

PB82-248873 PC **E04**/MF **E04**
Water Research Centre, Stevenage (England).
Sewage Sludge Disposal: A Strategic Review and Assessment of Research Needs,
V. K. Collinge, and A. M. Bruce. c1981, 34p TR-166

Contents:
- Present practices and costs;
- Dumping at sea;
- Disposal to land;
- Incineration;
- Practices and trends in other European countries;
- UK research strategy;
- Research programmes and priorities;
- Current research;

Future research.

PB82-248949 PC **E04**/MF **E04**
Water Research Centre, Stevenage (England).
Getting More Out of a Filter Press,
G. Hoyland, M. Day, and R. C. Baskerville. c1981, 32p TR-173

Sewage sludges are commonly dewatered in filter presses to produce cakes that are normally disposed of on land or incinerated. To allow dewatering into a concentrated cake in a reasonable time, sludges are usually conditioned with chemicals before filtration. This report derives a new theory of filter pressing which can be easily applied in practice. A small microprocessor programmed with the theory can monitor the progress of any filter pressing and, in its later stages, predict the residual pressing time required to produce a cake of a given quality.

PB82-248964 PC **E05**/MF **E05**
Water Research Centre, Stevenage (England).
The Prediction of Friction Losses for the Flow of Sewage Sludges in Straight Pipes.
Technical rept.,
R. C. Frost. c1982, 69p TR-175

There is a need for improved methods of pipeline design, to remove the uncertainty attached to the design of systems for conveying thick sludges. In this report is is shown that empirical methods, based on the multiplication of friction losses for water by a factor, are only satisfactory when sludge is in turbulent flow. Sludges being that much more viscous than water, however, flow is more likely to be laminar. Moreover, the apparent viscosity of a sludge in laminar flow varies with flow rate. It is because of these facts that the ratio of sludge-to-water friction losses can be so variable. More soundly based methods of estimating friction losses are evaluated in the light of results from extensive viscometric tests - using a 12/27-mm tube-viscometer - and 104-mm pipeline trials with primary, activated and digested sludges.

PB82-248980 PC **E05**/MF **E05**
Water Research Centre, Stevenage (England).
A Guide to Water Network Analysis and the WRC Computer Program WATNET. Part I.
Technical rept.,
R. Crabbe, J. D. Creasey, D. B. Field, R. F. Lacey, and K. Stimson. c1982, 58p TR-177

In the context of pipe systems for water distribution, the term network analysis describes the investigation of the complex relationships between the network specification, the consumptions, the pressures and the flow. The report reminds engineers of the value of network analysis when, for example, assessing the performance of an existing system, considering extension or reinforcement, planning mains renewal or investigating operational problems. The report also provides a guide to the practical aspects of data collection and a user guide to enable the engineer to use the batch version of the computer program WATNET.

PB82-249012 PC **A07**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Civil Engineering.
Dynamic Stiffness and Seismic Response of Pile Groups,
Amir M. Kaynia, and Eduardo Kausel. Jan 82, 131p MIT-CE-R82-03, NSF/CEE-82023
Grant NSF-PFR79-02989

A formulation for the analysis of pile groups in layered semi-infinite media is presented. The formulation is based on the introduction of a soil flexibility matrix as well as on dynamic stiffness and flexibility matrices of the piles to relate the discretized uniform forces to the corresponding displacements at the pile-soil interface. Pile group analyses revealed that behavior is highly frequency dependent as the result of wave interferences occurring between the various piles in the group. Large values for stiffnesses as well as large magnification factors for the groups essentially follow the low frequency components of the ground motion. The rotational component is negligible for typical dimensions of the foundation.

PB82-249202 PC **A04**/MF **A01**
SRI International, Menlo Park, CA.
Trace Chemical in the 'Clean' Troposphere.
Interim rept. 1979-80,
H. B. Singh, L. J. Salas, and R. Stiles. Oct 81, 57p EPA-600/3-81-055
Grant EPA-R-806729

Atmospheric measurements at Point Arena, California (39 N) are used to assess the burden as well as the growth rates of a large number of important atmospheric trace chemicals. In early 1981 the organic fluorine, chlorine, bromine, and iodine burden of the northern hemisphere (midlatitudes) was determined to be 1.3 parts per billion (ppb), 3.7 ppb, 0.02 ppb, and less than 0.003 ppb respectively. An increase of approximately 25 percent in the atmospheric burden of fluorine and chlorine appears to have occurred over the last three years. The dominant natural halocarbon, methyl chloride, does not appear to show any detectable trends. Among the important man-made chemicals such as methylene chloride, 1,2 dichloroethane, tetrachloroethylene, and trichloroethylene, slightly declining trends or change is evident.

PB82-249913 PC **A09**/MF **A01**
Coates (J.F.), Inc., Washington, DC.
Environmental Consequences of Telematics: Telecommunication, Computation, and Information Technologies,
Andrea Burgard Coolidge, Joseph F. Coates, Henry H. Hitchcock, and Teresa Gorman. Apr 82, 193p EPA-600/8-82-018
Contract EPA-68-02-3667

Current important research needs whose results will be critical to Environmental Protection Agency's mission in the next two to three decades with regard to a major expansion in the use of telematics, i.e. telecommunications, computer, and information technology, are identified. The potential benefits of telematics to the economy, the environment, and to health and safety are very large and numerous. Benefits will far outweigh the potential social costs. Most of the benefits of telematics are likely in the long run to be provided by the private sector. There are three classes of meta-impacts which would result from the large-scale, pervasive use of telematics in American society, each of which could, in itself, have far more important environmental impacts than any other effects. Primary and secondary research needs are defined with regard to these and other risks and opportunities.

PB82-250002 PC **A07**/MF **A01**
National Safety Council, Chicago, IL.
An Assessment of Public Fire Education Programs for Low Income Urban Residents.
Final rept.,
Stephanie A. Klones, Thomas W. Planek, Kathryn E. H. Race, and Sharon L. Gamache. Sep 80, 138p
Contract FA-79063

The National Safety Council, under contract with the United States Fire Administration conducted a two phased project. It's purpose was to investigate the state of the art of fire education for low income urban residents and other minority groups by identifying collecting, and assessing existent programs and materials, including print and audiovisual.

PB82-251430 PC **A10**/MF **A01**
Gannett, Fleming, Corddry and Carpenter, Inc., Harrisburg, PA.
Rail Modernization Study Design.
Final rept. Jan-Jun 82,
J. Q. Hargrove, H. W. Merritt, D. J. Mitchell, G. K. Gillan, and W. McCullam. Jun 82, 204p UMTA-IT-06-0270-82-1
Contract DTUM-60-82-C-71134
Prepared in cooperation with Lea, Elliott, McGean and Co., Batteile Columbus Labs., Madison Madison International, and Ammann and Whitney.

This is a study to design and determine the costs of upgrading and modernizing the Nation's rail transit facilities. The design includes a discussion of the modernization/rehabilitation issues, the development of a rail system evaluation methodology, a detailed study plan to establish the modernization/rehabilitation requirements for all of the rail transit facilities, and the study cost and period of performance schedules. Basic terms were defined and program goals established. A quantitative decision-making method for rail modernization projects is described and includes the determination and definition of the system elements to be evaluated; the measures of effectiveness (MOEs) and measure of effectiveness standards; and performance indicators that provide estimates of the benefits to be derived from proposed improvements.

PB82-251745 PC **A05**/MF **A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg.
The Application of Remote Sensing to Site- and Species-Specific Wildlife Habitat Analysis.
Technical rept.,
Joel T. Heinen, and Roy A. Mead. Feb 82, 90p
REMOTE SENSING RR-82-2, NFAP-292
Contract USDA/FS-13-1134
Sponsored in part by National Aeronautics and Space Administration, Washington, DC. National Oceanic and Atmospheric Administration, Washington, DC. Agency for International Development, Washington, DC. Department of the Interior, Washington, DC.

The major objective of this study is to test a proposed index designed to measure spatial relationships as an index of wildlife habitat quality. The index is species specific and is a function of interspersion, juxtaposition, and the presence of exclusion factors within the area, and for the species in question. A sensitivity analysis is conducted to determine how changes in various parameters affect the index value. These parameters include: cell size, cell shape, number of cover types, weighing factors, and classification accuracy.

PB82-251869 PC **A03**/MF **A01**
California Inst. of Tech., Pasadena. Div. of Chemistry and Chemical Engineering.
The Origin and Fate of Airborne Pollutants Within the San Joaquin Valley. Volume I: Executive Summary.
Final rept. Oct 78-Sept 79,
T. B. Smith, D. E. Lehrman, D. D. Reible, and F. H. Shair. Jun 81, 26p ARB-R-81/158
Contracts ARB-A7-165-30, ARB-A7-171-30
See also Volume 2, PB82-251877. Also pub. as Meteorology Research, Inc., Altadena, CA. rept. no. MRI-FR-1838-VOL-1.
Also available in set of 5 reports PC E99, PB82-251851.

A comprehensive field study was carried out in 1978-79 in the San Joaquin Valley to investigate the origin and fate of airborne pollutants in the valley. Specific objectives of the study were to determine the transport/dispersion characteristics and the ventilation budget of the valley together with its air quality and particulate aspects. The field programs which formed the observational base of the study consisted of 17 tracer releases in 1978 and 1979. Each release was supported by special air quality and meteorological sampling. Late fall and winter are characterized by near-stagnant conditions interrupted by occasional scouring events resulting from frontal passages. Residence time for pollutants released into the valley was estimated to be two to eight days during the winter. Principal ventilation mechanisms are upslope flows and limited afternoon flow over the Tehachapi Mountains at the southeast end of the valley. During summer and early fall, ventilation of the valley is characteristically good. Residence times for pollutants are estimated to be one to two days. Primary mechanism for ventilating the valley is the daytime, northwest flow over the Tehachapi Mountains. Slope flow in the southern half of the valley contributes in a minor but significant manner. During the night this northwesterly flow continues into the northern end of the valley with only slight reductions in magnitude. This nocturnal influx of air is exhausted in the southern part of the valley by a complex flow pattern in which the Fresno Eddy plays a major role. The northwest flow over the Tehachapis during the afternoon results in significant impact in the Mojave Desert.

PB82-251877 PC **A09**/MF **A01**
California Inst. of Tech., Pasadena. Div. of Chemistry and Chemical Engineering.
The Origin and Fate of Airborne Pollutants Within the San Joaquin Valley. Volume II: Extended Summary and Special Analysis Topics.
Final rept. Oct 78-Sep 79,
T. B. Smith, D. E. Lehrman, D. D. Reible, and F. H. Shair. Jun 81, 184p ARB-R-81/159
Contracts ARB-A7-165-30, ARB-A7-171-30
See also Volume 1, PB82-251869 and Volume 3, PB82-251885. Also pub. as Meteorology Research, Inc., Altadena, CA. rept. no. MRI-FR-1838-VOl-2.
Also available in set of 5 reports PC E99, PB82-251851.

An extensive air quality and tracer observational program was carried out in four phases from November 1978 to October 1979 in the San Joaquin Valley. Purpose of the program was to determine the transport routes into and out of the valley, to investigate the chemical composition of particulates and determine

their sources and to acquire a data base for use in developing regional models.

PB82-251885 PC **A09**/MF **A01**
California Inst. of Tech., Pasadena. Div. of Chemistry and Chemical Engineering.
The Origin and Fate of Airborne Pollutants Within the San Joaquin Valley. Volume III: Winter Field Study.
Final rept. Oct 78-Sep 79,
T. B. Smith, D. E. Lehrman, D. D. Reible, and F. H. Shair. Jun 81, 180p ARB-R-81/160
Contracts ARB-A7-165-30, ARB-A7-171-30
See also Volume 2, PB82-251877, and Volume 4, PB82-251893. Also pub. as Meteorology Research, Inc., Altadena, CA. rept. no. MRI-FR-1838-VOI-3.
Also available in set of 5 reports PC E99, PB82-251851.

Winter months in the San Joaquin Valley are characterized meteorologically by stable periods with light winds interrupted by occasional cold frontal passages with moderate to strong winds. These frontal passages scour out the valley and effectively remove most of the pollutants. The effectiveness of the stabilizing process after a frontal passage is evidenced by the rapid decrease in visibility throughout the valley. These restricted visibility periods continue until the next trough passage. The present volume (Volume 3) discusses the details of the winter field program including all pertinent tracer and aircraft sampling data. Surface and pibal wind data have been furnished to CARB on magnetic tape.

PB82-251893 PC **A09**/MF **A01**
California Inst. of Tech., Pasadena. Div. of Chemistry and Chemical Engineering.
The Origin and Fate of Airborne Pollutants Within the San Joaquin Valley. Volume IV: Summer Field Study.
Final rept. Oct 78-Sep 79,
T. B. Smith, D. E. Lehrman, D. D. Reible, and F. H. Shair. Jun 81, 183p ARB-R-81/161
Contracts ARB-A7-165-30, ARB-A7-171-30
See also Volume 3, PB82-251885, and Volume 5, PB82-251901. Also pub. as Meteorology Research, Inc., Altadena, CA. rept. no. MRI-FR-1838-VOI-4.
Also available in set of 5 reports PC E99, PB82-251851.

An extensive observational program, lasting from November 1978 until October 1979, was carried out to investigate the origin and transport of pollutants in the San Joaquin Valley. Field studies were conducted during the winter, summer and fall. Volume 3 describes the results of the November 15, 1978-December 10, 1978 intensive field study, along with two additional tracer experiments conducted during relatively stagnant conditions in February 1979 and March 1979. The present volume (Volume 4) describes the summer (July 1979) program.

PB82-251901 PC **A10**/MF **A01**
California Inst. of Tech., Pasadena. Div. of Chemistry and Chemical Engineering.
The Origin and Fate of Airborne Pollutants Within the San Joaquin Valley. Volume V: Fall Field Study.
Final rept. Oct 78-Sep 79,
T. B. Smith, D. E. Lehrman, D. D. Reible, and F. H. Shair. Jun 81, 223p ARB-R-81/162
Contracts ARB-A7-165-30, ARB-A7-171-30
See also Volume 4, PB82-251893. Also pub. as Meteorology Research, Inc., Altadena, CA. rept. no. MRI-FR-1838-VOI-5.
Also available in set of 5 reports PC E99, PB82-251851.

September is a transition month from summer to fall in the San Joaquin Valley. Surface temperatures begin to decrease from the intense heating days of summer. The problems of concern in the valley during September are similar to those occurring in the summer months. These problems include transport patterns within the valley, ventilation mechanisms for removal of pollutants from the valley and a characterization of the air quality and particulate chemistry. The present volume (Volume 5) discusses the details of the September field program including all pertinent tracer and aircraft sampling data.

PB82-252263 PC **A04**/MF **A01**
Berger (Louis) International, Inc., East Orange, NJ.
Syrian Arab Republic Comprehensive Transport Study. Volume I: Executive Summary.
Final rept.
Mar 81, 63p AID-PN-AAJ-415
See also Volume 2, PB82-252271. Sponsored in part by Ministry of Transport, Damascus (Syria). Prepared iin cooperation with Tippetts-Abbett-McCarthy-Stratton, New York.
Also available in set of 7 reports PC E99, PB82-252255.

The study covers all aspects of transport except intraurban transport and includes an appraisal of Syria's construction and storage industries as they relate to transport. Syria has all the infrastructure needed for an adequately functioning transport sector. The report recommends actions to the Government of Syria (GOS) in each of the key sectors discussed in the series. A final section presents preliminary investment recommendations based on a strictly economic comparison of alternative scenarios projecting the transport sector's requirements from 1980 to 2000.

PB82-252271 PC **A09**/MF **A01**
Berger (Louis) International, Inc., East Orange, NJ.
Syrian Arab Republic Comprehensive Transport Study. Volume II: Transport Demand.
Final rept.
Mar 81, 197p AID-PN-AAJ-416
See also Volume 1, PB82-252263 and Volume 3, PB82-252289. Sponsored in part by Ministry of Transport, Damascus (Syria). Prepared in cooperation with Tippetts-Abbett-McCarthy-Stratton, New York.
Also available in set of 7 reports PC E99, PB82-252255.

This report, the second of a seven volume study on the Syrian transport sector, analyzes, against a background of demographic and economic data, demands placed on the Syrian transport system by domestic freight, transit, passenger, and tourist traffic.

PB82-252289 PC **A11**/MF **A01**
Berger (Louis) International, Inc., East Orange, NJ.
Syrian Arab Republic Comprehensive Transport Study. Volume III: Railways.
Mar 81, 229p AID-PN-AAJ-417
See also Volume 2, PB82-252271 and Volume 4, PB82-252297. Sponsored in part by Ministry of Transport, Damascus (Syria). Prepared in cooperation with Tippetts-Abbett-McCarthy-Stratton, New York.
Also available in set of 7 reports PC E99, PB82-252255.

Syria has embarked upon an ambitious expansion of its rail system which, by 1985, will adequately meet national rail transport demand through the year 2000. The study analyzes both of Syria's rail lines, the Chemin-de-fer Syrien (CFS) and the Chemin-de-fer Hijaz (CFH). Passenger tariffs are presently well below the marginal cost of running the CFS efficiently and should be raised to meet operating costs. The CFH is Syria's narrow gauge rail network which in the past depended for its livelihood on the transport of passengers and freight from east to west. Despite dieselization and added rolling stock, CFH is generally not competitive with other forms of overland traffic and a closure of its Damascus-Dera'a line appears inevitable. More importantly, Syria is conducting a feasibility study to determine the utility of replacing CFH with a standard gauge line.

PB82-252297 PC **A15**/MF **A01**
Berger (Louis) International, Inc., East Orange, NJ.
Syrian Arab Republic Comprehensive Transport Study. Volume IV: Roads and Road Transport.
Final rept.
Mar 81, 345p AID-PN-AAJ-418
See also Volume 3, PB82-252289 and Volume 5, PB82-252305. Sponsored in part by Ministry of Transport, Damascus (Syria). Prepared in cooperation with Tippetts-Abbett-McCarthy-Stratton, New York.Portions of this document are not fully legible.
Also available in set of 7 reports PC E99, PB82-252255.

Syria's roads are unlikely to accomodate traffic increases projected to the year 2000 without significant modifications. The current road system is a mixture of deficiency and overdevelopment. Notable portions of both paved and unpaved rural roads are of a quality either too high or too low for their current traffic, and road conditions are deteriorating on 83% and 95.5% of these roads respectively. Based on the least-cost alternative system of investment evaluation, the study concludes that the proposed highway betterment program will yield high economic benefits and that a marginal cost pricing policy for passenger transport would substantially reduce total system costs by 2000. Also provided are a list of investment priorities under the 1981-85 development plan, additional priorities for the period 1986-2000, and an estimate of income from road user charges.

PB82-252305 PC **A13**/MF **A01**
Berger (Louis) International, Inc., East Orange, NJ.
Syrian Arab Republic Comprehensive Transport Study. Volume V: Ports and Shipping.
Mar 81, 285p AID-PN-AAJ-419
See also Volume 4, PB82-252297 and Volume 6, PB82-252313. Sponsored in cooperation with Ministry of Transport, Damascus (Syria). Prepared in cooperation with Tippetts-Abbott-McCarthy-Stratton, New York.
Also available in set of 7 reports PC E99, PB82-252255.

Syria's planned expansion of the ports of Tartous and Lattakia will provide the nation with sufficient port capacity through the year 2000. The report's underlying assumption of an average one-shift per day loading rate is only possible if at both ports Syria: (1) implements a new, graduated tariff regime; (2) institutes unitized cargo handling; (3) improves coordination of road and rail transport to and from the ports; (4) improves the use of storage facilities and customs clearance procedures; and (5) develops a manpower training program.

PB82-252321 PC **A11**/MF **A01**
Berger (Louis) International, Inc., East Orange, NJ.
Syrian Arab Republic Comprehensive Study. Volume VII: Transport Sector Plans.
Final rept.
Mar 81, 231p AID-PN-AJJ-421
See also Volume 6, PB82-252313. Sponsored in part by Ministry of Transport, Damascus (Syria). Prepared in cooperation with Tippetts-Abbett-McCarthy-Stratton, New York.
Also available in set of 7 reports PC E99, PB82-252255.

Using the Syrian Transport Analysis System (SYRTRANS), a computerized management information system, this report assesses prospects and plans for the transportation sector as a whole. Because data on Syria's transport sector have gaps, are inconsistent, and are poorly managed, the consultants developed SYRTRANS for the Government of Syria (GOS). SYRTRANS' structure (including individual data banks) and methods are described along with its major uses--predicting the quantity and type of traffic each subsector can accommodate, seeking ways to reduce costs and optimize facility use, and analyzing modal split.

PB82-252412 PC **A03**/MF **A01**
National Park Service, Atlanta, GA. Southeast Regional Office.
Interpreting Dynamics of Aquatic Resources: A Perspective for Resource Managers.
Research/Resources Management rept.,
Gary L. Larson. Aug 80, 29p R/RM/SER-34

Since the presentation of the Leopold Report (Leopold et al. 1963) to the U.S. Department of the Interior, recommendations in the document for managing national park resources on the ecosystem level have been included in the management policies of the National Park Service. In many instances, however, management programs have continued to focus on individual resource problems, without apparent concern for the ecological consequences on ecosystems. Without knowledge of the interrelationships of ecosystem components, solving one problem may result in other resource problems. This report presents graphic approaches as potential tools to view these complex relationships relative to the needs of the resource manager. Interpreting the dynamics of aquatic systems is emphasized.

PB82-252453 PC **A03**/MF **A01**
National Park Service, Atlanta, GA. Southeast Regional Office.
Beaver Reoccupation and an Analysis of the Otter Niche in Great Smoky Mountains National Park.
Research/Resources Management rept.,
Francis J. Singer, David LaBrode, and Lorrie Sprague. 1981, 28p R/RM/SER-40

Beaver (Castor canadensis) reoccupied Great Smoky Mountains National Park in 1966 after an absence of 100 to 200 years. Beaver inhabit only streams with gra-

dients less than 3.4 percent, and even in these situations, waters are not dammable, and beaver are bank dwellers. Beaver will have little impact in the park since few dam sites occur and their utilization rates on streamside vegetation is low. Beaver may increase marshy habitat in the park and ultimately benefit several threatened and endangered plants. Otter (Lutra canadensis) disappeared from the park the same year it was created in 1936. Only 144 kilometers of potential otter waterway exists near the park periphery in four disjunct locations, suggesting that the park alone could not support a self-sustaining population.

PB82-252487 PC **A03**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Multiple Choice Models in Transport Assessment,
M. G. Langdon. c1982, 32p TRRL/LR-1048
Also pub. in ISSN-0305-1293.

The use of choice models is widespread in transport studies. A review of existing choice models includes a critical description of multinomial logit, structured logit, and multinomial probit models. It is concluded that although the logit models are adequate for some purposes, they are unable to provide a good enough representation of reality when correlation between alternatives is significant, as in some aspects of modal split and route choice modelling. In these cases the multinomial probit model, based on multivariate normal cost distributions, appears to provide an acceptable alternative. Unfortunately analytic solutions are not available for problems with more than two choice alternatives, and recourse has to be made to approximate solutions, with their attendant problems of long computation time or inaccuracy. The best existing numerical approximation is provided by the 'Clark' method which, although usually of sufficient accuracy, sometimes gives rise to significant errors. A new approximation method is described in outline which, at the expense of some additional complexity, provides significantly better accuracy than the Clark method, especially for small choice probabilities. (Copyright (c) Crown Copyright 1982.)

PB82-252552 PC **A03**/MF **A01**
National Park Service, Atlanta, GA. Southeast Regional Office.
A Survey of Ecological Inventory, Monitoring, and Research in U.S. National Park Service Biosphere Reserves.
Research/Resources Management rept.,
Alison Mack, William P. Gregg, Jr., Susan P. Bratton, and Peter S. White. Aug 81, 32p R/RM/SER-49
Prepared in cooperation with Cornell Univ., Ithaca, NY.

This report describes the findings of a survey of the 14 International Biosphere Reserves managed by the U.S. National Park Service under the United Nation's Man and the Biosphere (MAB) Program. The survey assessed the completeness of the reserves' baseline resource inventory, long-term monitoring, and long-term ecological research programs. Geographical features and archives were the most completely represented items of inventory; disturbance and aquatic ecosystems were the least represented.

PB82-252644 PC **A03**/MF **A01**
Transportation Research Board, Washington, DC.
Enforcement of Priority Treatment for Buses on Urban Streets.
Final rept.,
John J. Roark. May 82, 41p TRB/NCTRP/SYN-2, ISBN-0-309-03415-9
Contract DTUM60-81-C-72012
Library of Congress catalog card No. 82-60315. Also pub. in ISSN-0732-1856. Report on National Cooperative Transit Research and Development Program, Synthesis of Transit Practice.
Paper copy also available from Transportation Research Board, 2101 Constitution Ave., NW, Washington, DC 20418.

This synthesis report will be useful to transit operators, transportation planners, traffic engineers, and others concerned with bus operations and traffic control in urban areas. Detailed information is presented on the role of enforcement in the successful operation of programs for priority treatment of buses on urban streets. Various priority treatment techniques are used for buses on freeways and arterials. Enforcement has been found to be an important factor in the success of these efforts, but is frequently not given adequate attention in bus priority strategies for urban streets. This report of the Transportation Research Board presents information on the role of enforcement in bus priority operations and recommends enforcement measures and design guidelines.

PB82-252792 PC **E02**/MF **E02**
National Maritime Inst., Feltham (England).
Time-Averaged Aerodynamic Forces and Moments on a Model of a Two-Legged Concrete Offshore Platform,
C. F. Cowdrey. c1982, 15p NMI/R-36, OT-R-7809

Wind-tunnel measurements have been made of the time-averaged aerodynamic forces and moments on an above-water model of a two-legged gas platform based on the McAlpine, Frigg TPI. The results of the measurements are presented in this report in the form of dimensional factors which can be used to derive full-scale values.

PB82-252982 PC **A08**/MF **A01**
Southern Illinois Univ. at Carbondale.
Relative Effects on Stream Biota of Chlorine and Ammonia Occurring in Secondary Sewage.
Final rept.,
William M. Lewis, Roy C. Heidinger, Michael H. Paller, and Lawrence J. Wawronowicz. Nov 81, 166p IINR-81/35

Illinois pollution standards prohibit sewage treatment plants from discharging effluents which elevate ammonia levels in streams above specified limits, but evidence suggests that chlorine added to effluent for disinfection actually causes much of the environmental damage attributed to ammonia toxicity. This report examines what happened to fish and invertebrates in three streams near Champaign-Urbana when chlorine -- but not ammonia -- was eliminated from sewage treatment effluents entering the streams.

PB82-253014 PC **A04**/MF **A01**
Iowa Inst. of Hydraulic Research, Iowa City.
Earthquake Effects on Rectangular Dam-Reservoir Systems,
T. H. Huang, and Allen T. Chwang. Jul 82, 59p IIHR--245
Grant NSF-PFR77-16085

This study deals with the earthquake effect on a three-dimensional, rectangular dam-reservoir system with vertical boundary. Both the longitudinal and the lateral harmonic ground excitations have been investigated. The compressibility of water, the seismic wave attenuation and the phase difference between two ends of a reservoir are considered. Analytic solutions are obtained for the hydrodynamic pressures, forces, and moments by using the method of orthogonal expansions. The possibility of resonance is discussed. Resonances tend to occur for a deep dam excited by a ground motion of small seismic period. The effects of the seismic wave attenuation, the phase difference, and the length of a reservoir are found to be small.

PB82-253022 PC **A10**/MF **A01**
IIT Research Inst., Chicago, IL.
Identification of Sources Causing TSP Non-Attainment: Analysis of Historical High-Volume Filters, Decatur and Quad Cities Areas.
Final rept.,
Edward Arnold, and Ronald G. Draftz. Aug 79, 207p IINR-79/21

Mineral particles, primarily limestone, quartz, and feldspar, are prime contributors to high TSP levels occuring in both the Decatur and Quad Cities areas. The size and morphology of the mineral particles collected at the Decatur sites indicate nearby sources; vehicular traffic on paved roads and on adjacent gravel parking lots and driveways are suspected to be the primary sources. Starch granules and fugitive foundry emissions were occasional heavy contributors. The Quad Cities collecting sites are even more heavily impacted by mineral particles, primarily small limestone fragments. Evidence exists that both cement plant and limestone crushing operations are source for this material in addition to paved and unpaved roads.

PB82-253063 PC **A02**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Minibus Pooling: The Ilford Experiment,
R. L. Jackson. c1982, 16p TRRL-SUPPLEMENTARY-739
Also pub. in ISSN-0305-1315.

The first known example of a minibus pool in Great Britain is reported. This form of travel involves a group of workers using a minibus to get to and from work, sharing its full running costs between them. The experimental service carried a group of employees of Plessey Avionics and Communications, living in the Chelmsford area, to a factory in Ilford. In-vehicle journey lengths lay between 21 and 37 miles. The report describes events leading up to the experiment, and the way in which the minibus pool was set up and run. It notes that the requirement for bus service licensing was a major hurdle to overcome. (Copyright (c) Crown Copyright 1982.)

PB82-253360 PC **A03**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Measurement of Rut Depths in Road Surfaces by the TRRL High-Speed Profilometer.
Final rept.,
P. G. Jordan, and P. B. Still. c1982, 27p TRRL/LR-1037
Also pub. in ISSN-0305-1293.

A method was developed for measuring deformation in the wheel paths of United Kingdom roads using a new high-speed profilometer. Factors affecting the accuracy of measurement were evaluated. Differences between measurements using the high-speed and the existing straightedge method were caused partly by the sampling error of the straightedge method and partly by the operator in controlling the line of measurement of the high-speed system. Repeatability of measurement was found to be such that, on average, 80 per cent or more of the repeat measurements differ by 1.5mm or less. Criteria for rut depth are presented for use with the high-speed system. A cheaper alternative to the profilometer is also described.

PB82-253824 PC **A02**/MF **A01**
British Carbonization Research Association, Chesterfield (England).
The Biological Treatment of Coke-Oven Effluents: Further Studies on the Role of Organic Inhibitors.
Carbonization research rept. (Final).
May 78, 10p BCRA/CRR-48

A small-scale activated sludge plant (2.65 liters) was set up with intermittent sludge return and the pH maintained at 7.0 by automatic addition of NaOH. An activated sludge from a works treating a sewage containing a small proportion of gas-purification waste was used and fed continuously with an influent containing 1000 ppm of thiocyanate. The organisms which developed were extremely active. Loadings were about 2.5 times greater than those previously obtained from systems treating coke-oven wastes in the presence of glucose, with no thiocyanate present in the effluent. This high activity was transferred to the treatment of coke-oven liquor (90 per cent) and water (10 per cent). At a retention of 10.8h thiocyanate removal was complete, with a 4h permanganate value loading of 5.04 kg/cu.m./day. The previous highest obtained was 3.0 kg/cu.m./day. On increasing the influent to undiluted liquor a marked deterioration in performance was obtained which after dilution and an increased retention time could not be reversed.

PB82-253972 PC **A12**/MF **A01**
National Park Service, Santa Fe, NM. Southwest Cultural Resources Center.
National Reservoir Inundation Study. Volume 1. Summary.
Final rept.,
Daniel J. Lenihan, Toni L. Carrell, Stephen Fosberg, Larry Murphy, and Sandra L. Rayl. 1981, 252p
See also Volume 2, PB82-253980.

The report volume I is, in this sense, a functional working manual for cultural resources management in reservoir areas. To increase its utility as a management tool, a detailed discussion of the question of mitigation is included. Besides outlining alternatives for reaction to specific inundation events, it discusses the overall question of building cultural resource management concerns into the reservoir construction process.

PB82-253980 PC **A99**/MF **A01**
National Park Service, Santa Fe, NM. Southwest Cultural Resources Center.
National Reservoir Inundation Study. Volume 2. Technical Papers.
Final rept.,

Daniel J. Lenihan, Toni L. Carrell, Stephen Fosberg, Larry Murphy, and Sandra L. Rayl. 1981, 847p
See also Volume 1, PB82-253972.Color illustrations reproduced in black and white.

The Final Report of the National Reservoir Inundation Study has two objectives. The first is to present detailed information on field and experimental research that provided most of the data that is summarized and synthesized in Volume I. Much of the data presented in that volume is the result of research conducted under contract to the National Reservoir Inundation Study by archeologists involved in mitigation research in proposed and existing reservoirs located throughout the country. The second objective of the report is to present information on reservoir cultural resource management, freshwater inundation effects, and archeological data retrieval and mitigation techniques.

PB82-254111 PC **A06**/MF **A01**
National Marine Fisheries Service, Woods Hole, MA. Northeast Fisheries Center.
Gulf and Atlantic Survey for Selected Organic Pollutants in Finfish.
Technical memo.,
Paul D. Boehm, and Pam Hirtzer. Apr 82, 121p
NOAA-TM-NMFS-F/NEC-13, NOAA-82070201

The issues combines two reports. The first report, 'Gulf and Atlantic Survey for Selected Organic Pollutants in Finfish. 1: Gulf of Maine to Cape Hatteras,' presents information on both finfish and benthic invertebrates. The second report, '2: Chesapeake Bay to Port Isabel, Texas,' presents information on finfish only. Selected finfish and benthic ecpfaunal samples were analyzed for levels of petroleum hydrocarbons, chlorinated hydrocarbons, and polynuclear aromatic hydrocarbons contained in edible flesh. The project's goals were to scrutinize a 100-sample subset for the above organic pollutants.

PB82-254137 PC **A04**/MF **A01**
Iowa Inst. of Hydraulic Research, Iowa City.
Hydrodynamic Effect of Earthquakes on Circular Dam-Reservoir Systems,
D. S. Kadle, and Allen T. Chwang. Aug 82, 74p IIHR-246
Grants NSF-CME80-20564, NSF-ENG79-10049

The present study deals with the hydrodynamic effect of earthquakes on a three-dimensional dam-reservoir system. Analytical solutions in closed forms have been obtained when the reservoir is circular or semi-circular in shape. The effects of surface waves and compressibility of the fluid in the reservoir have also been included. In the case of no surface waves, it was found that the in-phase component of the hydrodynamic pressure increases with the depth maximum value at the base of the dam. In the presence of surface waves, the in-phase component was slightly reduced for small values of the wave-effect parameter C. However, for large values of C, the pressure distribution was found to be oscillatory. Resonances were found to occur when the ratio of the fluid depth to the period of the ground motion was greater than 360 m/sec.

PB82-254152 PC **A06**/MF **A01**
Hart (Fred C.) Associates, Inc., Washington, DC.
A Study of State Fee Systems for Hazardous Waste Management Programs.
Final rept.
Jul 82, 111p EPA/SW-956
Contract EPA-68-01-5133

Review of state user fee laws and regulation for state hazardous waste programs revealed that 20 states have user fee regulations in place and six more are in the process ces of being developed. Nine states are collecting user fee revenues totaling greater than 50 percent of the state's required match for their Federal hazardous waste program grant. Issues in state development and implementation of user fees for their hazardous waste regulatory control programs are featured. Includes detailed case studies of seven fee states. An appendix to the report briefly highlights the 13 other fee states. The report is not a guidance but a reporting of state experience with hazardous waste user fees to date.

PB82-254186 PC **A10**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Social Aspects of Transport: How to Use Social Research in Transport Policy Making. The Proceedings of a conference held at West Dean, Chichester, 14-17 September 1980.
Final rept.
c1982, 218p TRRL/SR-689, TRRL-SUPPLEMENTARY-689
Also pub. in ISSN-0305-1315.

Delegates to the conference discussed a methodology of forecasting which emphasized five principles for practical research into transport planning. It was agreed that transport research should not only take account of access and mobility, but also their interaction with social structure and employment, because industrial societies seemed to create an ever-increasing demand for daily mobility. French researchers, as opposed to those in Germany or the UK., were particularly concerned with opening up new areas for investigation, recognizing that transport problems were part of a wider set of social problems, and that psychological and sociological factors should be included in studies on mobility.

PB82-254202 PC **A08**/MF **A01**
WAPORA, Inc., Chicago, IL.
A Review of Concentrations, Chemical Composition, Size Distribution and Health Effects Related to Inorganic Inhalable Particulates in Illinois.
Final rept.,
Sherman U. Smith, D. J. Fingleton, and Terri-lyn Ozake Gedo. Apr 81, 157p 81/13

This study is designed to provide Illinois regulatory agencies with a basis on which to evaluate human health and associated impacts of a size-specific standard on the citizens of Illinois. The study presents an analysis of current and historic data on the concentrations, size distributions, and chemical compositions of the inorganic inhalable fraction of suspended particulate matter collected in selected areas of Illinois, a review of the literature on the human health effects of inorganic inhalable particulates, and recommendations for studies that should be undertaken to define further the effects of inorganic inhalable particulates on the health of residents of Illinois.

PB82-254269 PC **A11**/MF **A01**
Triangle Universities Consortium on Air Pollution, Chapel Hill, NC.
Proceedings of the National Conference on Land Use Planning, Transportation Planning, and Air Quality Management Held at North Carolina Univ. at Chapel Hill on November 13-15, 1974,
Mayard M. Hufschmidt, and Asta C. Cooper. Nov 74, 232p
Contract EPA-68-02-1240
Sponsored in part by Department of Transportation, Washington, DC.

This conference was held to improve communication between those concerned with air quality management and those concerned with land use and transportation planning. The sessions are aimed at identifying the major problems and issues that exist in fitting together land use and transportation plans and policies with air quality objectives and programs. There are sessions dealing with the legal and policy setting situation, planning and air quality maintenance at the urban-metropolitan scale, regional air quality management programs and information needed by land and transportation planners and managers.

PB82-254301 PC **A02**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Trials of Computer-Generated Public Transport Travel Information in Wiltshire.
Final rept.,
M. W. Pickett. c1982, 25p TRRL/LR-1036
Also pub in ISSN-0305-1293.

Computer systems programs were produced to provide travel information for multi-mode public transport journeys to benefit the public and the transport operators. The objective was to achieve shorter journey times, fewer interchanges and more trip-opportunities. For ten months the travel enquiry bureaus and libraries of three towns in Wiltshire used the COM-fiche output which gave information on travel to various destinations in the county. The benefits of the system were assessed only by attitudinal surveys of staff and the public, due to problems in obtaining quantitative data on the actual effect of the guide on the use of multi-mode journeys.

PB82-254426 PC **A03**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Characteristics of Public Transport Demand in Indian Cities.
Final rept. 1978-80,
D. A. C. Maunder, P. R. Fouracre, M. G. Pathak, and C. H. Rao. c1982, 29p TRRL/SR-709, TRRL-SUPPLEMENTARY-709
Also pub. in ISSN-0305-1315.

Surveys were made in a number of Indian cities on the demand for public transport services. The purpose of the project was to investigate the effectiveness of urban public transport and to relate travel patterns to the socioeconomic characteristics of the passengers. Surveys took the form of passenger interviews.

PB82-254541 PC **A03**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Terrain Evaluation for Highway Planning and Design,
P. J. Beaven, and C. J. Lawrance. c1982, 38p TRRL/SR-725
Also pub. in ISSN-0305-1315. Prepared in cooperation with Overseas Development Administration, London (England).

Terrain evaluation is the process of using all sources of information to derive an understanding of the engineering characteristics of an area chosen for a detailed terrain study, as an essential preliminary to highway survey and design. The basis of terrain evaluation is terrain classification, particularly landform analysis. Surface landform patterns, mapped from aerial photographs or satellite images, are strongly linked to the underlying geology, soils and moisture regime. The resulting terrain classification can be used to predict where changes in soil conditions occur, to relate individual samples to the overall project and to plan preliminary ground surveys. Aerial photographs and Landsat imagery are the two most useful forms of remote sensing, with panchromatic photography being used particularly in the tropics. Detailed photography can be provided by small format cameras, loaded with special film, carried by light aircraft. Interpretations of Landsat imagery can provide a terrain classification, with more detailed analysis being made by computer. Terrain evaluation is illustrated by examples from Africa and Asia.

PB82-254566 PC **A04**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
The Effects of the Withdrawal and Reduction of Rural Bus Services.
Final rept. 1977-79,
P. R. Oxley. c1982, 52p TRRL/SR-719
Also pub. in ISSN-0305-1315. Prepared in cooperation with Cranfield Inst. of Tech. (England).

The effects of reduction in stage carriage bus services in three rural areas were determined by before and after surveys. In one area, the effects on mobility and modal choice were slight, despite bus service changes which improved the revenue/cost ratio. In the second area, modal changes were recorded, but again without any significant loss of mobility to the former bus users. The third area, where the bus reductions were comparatively more severe, produced both modal change and a fall in mobility, mainly in journeys for social and shopping purposes. Estimates were made of the personal travel costs before and after the service changes in the second and third areas. The problem of placing a value on trips no longer made and trips made by non-vehicular means was addressed, but it was concluded that the net savings achieved by the operating bus companies usually outweighed the aggregate increase in personal costs borne by the former bus passengers. However, while the savings from the service reductions were spread throughout the community, the costs fell on relatively few individuals; but a minority were found who suffered real hardship through reductions.

PB82-255365 PC **A06**/MF **A01**
Purdue Univ., Lafayette, IN.
Collection and Treatment of Wastewater Generated by Pesticide Applicators.
Final rept.,
K. F. Whittaker, J. C. Nye, R. F. Wukash, R. J. Squires, and A. C. York. Mar 82, 110p EPA-600/2-82-028

Grant EPA-R-805466
Prepared in cooperation with Indinan Aeronautic Commission, Indianapolis.

Methods for control of pesticide contaminated wastewater were studied. Evaluation of practices that are currently used to handle pesticide contaminated wastewaters was followed by development of a system that could be used to collect the pesticide contaminated wastewaters. Then a treatment plant was developed to remove pesticide from contaminated wastewaters and produce a high-quality effluent. Three physical-chemical treatment options were evaluated. A flocculation/coagulation/sedimentation step was evaluated using alum as the coagulant. Additional studies were done using filtration and coalescence. Flocculation/coagulation/sedimentation removed a high percentage of the pesticides. The filtration and coalescence steps were less effective. The supernatant from the first step was then passed through activated carbon columns. A hydraulic loading rate of .5L/s-sq m was determined to be adequate with a residence time of approximately 15 minutes. The concentration of the pesticides in the clear effluent was usually less than 1 mg/liter.

PB82-255415 PC **A05**/MF **A01**
Colorado State Univ., Fort Collins.
Nitrates in Groundwater Resulting from Manure Applications to Irrigated Croplands,
Wynn R. Walker, and Bruce E. Kroeker. Jun 82, 94p EPA-600/2-82-079
Grant EPA-R-804827

Field data were collected from experimental plots located near Grand Junction Colorado. Data collections were designed to provide a sufficiently broad range of conditions such that a simulation model could be verified. The experimental plots were planted to corn and were furrow irrigated. The basic management practices investigated were irrigation frequency, irrigation efficiency, and manure loading rate. Climatological conditions, soil moisture, potential evapotranspiration, and irrigation system performance were measured in the field. Soil samples and percolation water collected immediately beneath the crop root zone were analyzed for various nitrogen species, total organic carbon, and common salinity cations and anions. Model simulations were run for a wide range of typical Grand Junction conditions to evaluate the effect of irrigation and animal manure utilization practices on nitrate movement to groundwater.

PB82-257148 PC **A03**/MF **A01**
Bureau of Mines, Pittsburgh, PA. Pittsburgh Research Center.
Sludge Disposal from Acid Mine Drainage Treatment.
Rept. of investigations/1982,
T. E. Ackman. Jun 82, 30p

The Bureau of Mines conducted a study of current trends in methods employed by the coal industry to dispose of acid mine drainage (AMD) treatment sludge. Thirty-three AMD treatment plants, operated by 11 Pennsylvania coal companies, were randomly surveyed. These plants provided data for calculating sludge volumes, as well as information on sludge settling, transportation, and disposal. Onsite visits allowed observation of problems associated with the various methods of sludge disposal: (1) disposal into a deep mine, (2) permanent retention in ponds, (3) disposal at an active coal refuse area, and (4) onsite burial. Method 1 is the most frequently used and the most environmentally sound. It is apparent, based on this representative sampling of AMD treatment plants, that the magnitude of sludge production is such that an aggressive and directed effort in reduction of sludge volume is seriously needed. The areas of major concern are (1) the amount of surface land required for sludge storage and disposal, (2) reclamation of these disturbed surface areas, and (3) effective and efficient means of removing, transporting, and disposing of AMD sludge. In this report, an engineering approach to the practical problems associated with the existing disposal methods is presented, together with recommendations for future research.

PB82-258740 PC **A15**/MF **A01**
Oak Ridge National Lab., TN.
Uranium in U.S. Surface, Ground, and Domestic Waters. Volume 1,
J. S. Drury, S. Reynolds, P. T. Owen, R. H. Ross, and J. T. Ensminger. Apr 81, 344p ORNL/EIS-192/V1, EPA-570/9-81-001
Contract W-7405-eng-26

The report summarizes published information concerning the concentrations of uranium in 89 994 U.S. surface, ground and domestic waters. Sources surveyed included the open literature, state health departments, federal agencies, and personal contacts. For each state, samples were geographically located, identified by type and use, and tabulated by decreasing uranium concentration. Histograms covering 14 concentration ranges were prepared for all surface, ground, and domestic water samples of each state and for the entire United States. Estimates were made of the population-weighted average concentrations of uranium in domestic waters of each state. Based on these averages, alpha radiation bone doses were computed for lifetime consumptions of each water. In addition, the fractions of water supplies in each state producing water containing uranium in excess of 1, 5, 10 and 20 pCi/L were estimated. An extensive discussion of analytical methods used to determine uranium in surface and ground waters was also included.

PB82-260837 PC **A08**/MF **A01**
Midwest Research Inst., Kansas City, MO.
River Basin Validation of the Water Quality Assessment Methodology for Screening Nondesignated 208 Areas. Volume I: Nonpoint Source Load Estimation.
Final rept. Sep 79-Nov 81,
Michael J. Davis, Michael K. Snyder, and John W. Nebgen. May 82, 159p EPA-600/3-82-057A
Grant EPA-R-806315
See also Volume 2, PB82-260845.

In earlier work under the sponsorship of EPA, loading functions were developed by Midwest Research Institute (MRI) for estimating the quantities of different diffuse loads entering receiving waters from nonpoint sources and a screening methodology was produced by Tetra Tech, Inc., for assessing water quality problems in areas not covered under Section 208 of the Federal Water Pollution Control Act Amendments of 1972. The two methods had never been applied together under realistic conditions, however, to demonstrate how the combined techniques might be used for identification of water quality problems in U.S. rivers. In this report, the successful application of the MRI-developed nonpoint loading procedures under field conditions in five river basins is described and the compatibility of these procedures with the 208 screening methodology is demonstrated. The basins in which the assessment techniques were used were the Sandusky River in Ohio and four Chesapeake Bay Basins (Patuxent, Chester, Occoquan, and Ware Rivers).

PB82-260845 PC **A11**/MF **A01**
Tetra Tech, Inc., Lafayette, CA.
River Basin Validation of the Water Quality Assessment Methodology for Screening Nondesignated 208 Areas. Volume II: Chesapeake-Sandusky Nondesignated 208 Screening Methodology Demonstration.
Final rept. Sep 79-Nov 81,
J. David Dean, Bob Hudson, and William B. Mills. May 82, 245p EPA-600/3-82-057B
Grant EPA-R-806315
See also Volume 1, PB82-260837.

In earlier work under the sponsorship of EPA, a screening methodology was produced by Tetra Tech, Inc., for assessing water quality problems in areas not covered under Section 208 of the Federal Water Pollution Control Act Amendments of 1972, and loading functions were developed by Midwest Research Institute (MRI) for estimating the quantities of different diffuse loads entering receiving waters from nonpoint sources. The two methods had never been applied together under realistic conditions, however, to demonstrate how the combined techniques might be used for identification of water quality problems in U.S. rivers. In this report, the successful application of the Tetra Tech-developed nondesignated 208 screening methodology under field conditions in five river basins is described, and the compatibility with the nonpoint source calculator is demonstrated.

PB82-262577 PC **A07**/MF **A01**
Little (Arthur D.), Inc., Cambridge, MA.
Ignition Sources of LNG Vapor Clouds.
Final rept. Aug 80-Nov 81,
D. J. Jeffreys, N. A. Moussa, R. N. Caron, and D. S. Allan. Jan 82, 132p 85279, GRI-80/0108
Contract GRI-5080-352-0325

This report presents a series of coordinated efforts to develop a data base for ignition sources of LNG vapor clouds in urban areas. A literature survey and field surveys of an urban area and of an LNG plant were conducted. Over 150 potential ignition sources were identified. The main source characteristics affecting ignition were analyzed, covering source density, accessibility to a vapor cloud, probability of activation during cloud exposure and ignition potential. Ignition tests were conducted on cigarettes, car lighters, automotive electrical systems and traffic light relays in a 7% methane/air mixture. Methodologies were developed to translate the results of tests and analyses into quantitative ignition probabilities. Sample probability values were estimated for selected sources.

PB82-263559 PC **A02**/MF **A01**
Continental Shelf Associates, Inc., Tequesta, FL.
Study of the Effect of Oil and Gas Activities on Reef Fish Populations in the Gulf of Mexico OCS Area. Volume II.
Executive summary.
Apr 82, 19p BLM-YM-PT-82-011-3331
Contract DI-AA551-CT9-36
See also Volume 1, PB82-263567.

The primary purposes of this study were: (1) to collect quantitative data for comparison of reef fish populations associated with natural hard bottom areas and offshore oil and gas structures and (2) to develop fish population sampling methods which can be applied in deep areas that exclude or limit direct observations. The study was designed as a three-phase effort each phase with specific objectives: (1) Phase I - evaluation of potential study sites; (2) Phase II - evaluation of equipment and methods; and (3) Phase III generation and evaluation of standing stock estimates for fish species. The study area was the northern Gulf of Mexico outer continental shelf (OCS) between 90 and 94 degres W longitude and the 18 and 200-m isobaths. There are numerous hard bottom areas described as 'natural reefs' within this area.

PB82-263567 PC **A10**/MF **A01**
Continental Shelf Associates, Inc., Tequesta, FL.
Study of the Effect of Oil and Gas Activities on Reef Fish Populations in the Gulf of Mexico OCS Area. Volume I.
Final rept.
Apr 82, 217p BLM-YM-PT-82-010-3331
Contract DI-AA551-CT9-36
See also Volume 2, PB82-263559.

The primary purposes of this study were: (1) to collect quantitative data for comparison of reef fish populations associated with natural hard bottom areas and offshore oil and gas structures and (2) to develop fish population sampling methods which can be applied in deep areas that exclude or limit direct observations. The study was designed as a three-phase effort each phase with specific objectives: (1) Phase I - evaluation of potential study sites; (2) Phase II - evaluation of equipment and methods; and (3) Phase III - generation and evaluation of standing stock estimates for fish species. The study area was the northern Gulf of Mexico outer continental shelf (OCS) between 90 and 94 degrees W longitude and the 18 and 200-m isobaths. There are numerous hard bottom areas described as 'natural reefs' within this area.

PB82-811209 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Railroad Freight Transportation. 1975-1980 (Citations from the NTIS Data Base).
Sep 82, 356p

The references cited deal with economic impacts, intermodal systems, energy studies, scheduling, rolling stock utilization, rail revitalization, accident studies, cost analyses, and characteristics within specific regions. The bibliography also covers freight car design, engineering, and testing programs as well as train engineering and operations. (This updated bibliography contains 348 citations, none of which are new entries to the previous edition.)

PB82-811217 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Railroad Freight Transportation. 1981-May, 1982 (Citations from the NTIS Data Base).
Sep 82, 90p

Supersedes PB81-805343 and PB80-805799.

The references cited deal with economic impacts, intermodal systems, energy studies, scheduling, rolling stock utilization, rail revitalization, accident studies, cost analyses, and characteristics within specific regions. The bibliography also covers freight car design, engineering, and testing programs as well as train engineering and operations. (This updated bibliography contains 80 citations, 71 of which are new entries to the previous edition.)

PB82-811324 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Thermal Pollution: Hydrology and Hydrodynamics. 1964-April 1981 (Citations from the NTIS Data Base).
Sep 82, 238p

Aspects of the hydrology and hydrodynamics of heated effluents are covered in the bibliography, including mixing, diffusion, modeling, heat transfer, and flow. (This updated bibliography contains 229 citations, none of which are new entries to the previous edition.)

PB82-811332 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Thermal Pollution: Hydrology and Hydrodynamics. May, 1981-June, 1982 (Citations from the NTIS Data Base).
Sep 82, 32p
Supersedes PB81-806127 and PB80-806508.

Aspects of the hydrology and hydrodynamics of heated effluents are covered in the bibliography, including mixing, diffusion, modeling, heat transfer, and flow. (This updated bibliography contains 23 citations, all of which are new entries to the previous edition.)

PB82-873290 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Water Supplies: Potential. 1976-August, 1982 (Citations from the Selected Water Resources Abstracts Data Base).
Rept. for 1976-Aug 82.
Aug 82, 124p
Prepared in cooperation with Office of Water Research and Technology, Washington, DC.

This bibliography contains citations concerning potential water supplies. Water resources and supply development, ground water and surface water availability, geohydrological survey, and aquifer characteristics are discussed. Decision making, project planning, test wells, population dynamics, water quality analysis, and legal aspects are included. Water supplies for municipal, domestic, livestock, irrigation, and industrial uses are also discussed. (Contains 82 citations fully indexed and including a title list.)

PB82-873563 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Tannery Wastes. 1977-August, 1982 (Citations from the Selected Water Resources Abstracts Data Base).
Rept. for 1977-Aug 82.
Aug 82, 115p
Prepared in cooperation with Office of Water Research and Technology, Washington, DC.

This bibliography contains citations concerning the effects and treatment of waste water from tannery operations. Treatment consists of chemical treatment, land treatment, biological treatment, and mechanical treatment. Often these are combined as in the case of mechanical aerating and metals separation combined with biological treatment of the sludge. Some citations specify changes in tannery beamhouse operations to reduce the quantity of waste water that must eventually be treated. (Contains 78 citations fully indexed and including a title list.)

PB82-873761 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Diatomaceous Earth: Properties and Applications. June, 1976-August, 1982 (Citations from the Energy Data Base).
Rept. for Jun 76-Aug 82.
Aug 82, 82p
Supersedes PB80-854284.Prepared in cooperation with the Department of Energy, Washington, DC.

This bibliography contains citations concerning the properties and applications of diatomaceous earth. The sorption properties and applications as scrubbers for gasification systems and filters for water are considered. (This updated bibliography contains 64 citations, 34 of which are new entries to the previous edition.)

PB82-874033 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Recreation Demand: Water Resources. 1977-August, 1982 (Citations from the Selected Water Resources Abstracts Data Base).
Rept. for 1977-Aug 82.
Aug 82, 137p
Prepared in cooperation with Office of Water Research and Technology, Washington, DC.

This bibliography contains citations concerning water based recreation demands. Recreational resources development and allocation, patterns of activities, recreation demand predication and planning, and water quality demand are discussed. Model studies, social behavior, and recreational benefit evaluation are included. (Contains 84 citations fully indexed and including a title list.)

PB82-874041 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Recreation Facilities: Water Resources. 1977-August, 1982 (Citations from the Selected Water Resources Abstracts Data Base).
Rept. for 1977-Aug 82.
Aug 82, 234p
Prepared in cooperation with Office of Water Research and Technology, Washington, DC.

This bibliography contains citations concerning water based recreation facilities. Park, lake, river, and coastal zone recreation activities are discussed. Water quality control, waste treatment, and sanitary engineering as related to recreation facilities are included. Legal aspects, economic evaluation, and epidemiologic studies are also discussed. (Contains 161 citations fully indexed and including a title list.)

13C. Construction Equipment Materials, and Supplies

DE82701218 MF **A01**
Statens Straalskyddsinstitut, Stockholm (Sweden).
Radon Exhalation from Building Materials.
B. Haakansson, and H. Moere. Sep 81, 20p SSI-A-81-19
In Swedish.
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

Two methods for the determination of the exhalation rate of radon out of building materials have been investigated. Radon is collected in a container which is pressed against the wall. One of tthe methods makes use of continous scanning of he accumulation of radon by means of an ion chamber. In the second case a sample is taken out of the container into the scincillation flask at an early stage of the accumulation. An estimation of errors and test of reproducibility are described together with the results from the measurement of a few walls. (Atomindex citation 13:658468)

N82-27537/1 PC **A03**/MF **A01**
National Building Research Inst., Pretoria (South Africa).
Report on the Suitability of Some Metallurgical Slags as Aggregate for Concrete.
A. F. G. Rossouw, J. E. Krueger, and J. Vandijk.
1981, 27p NBRI-SP-BOU-56, ISBN-0-7988-2044-6

Chrome, copper, and platinum slags were evaluated as aggregrates in concrete. Eight of the slags were determined to be suitable for use as aggregates, provided they do not contain unslaked lime. The availability, characteristics, chemical and physical properties, and particle sizes of the slags are given. Mix proportions and physical and mechanical properties of fresh concretes with differing aggregate-cement ratios are presented.

N82-28058/7 PC **A08**/MF **A01**
Cape Town Univ. (South Africa). Dept. of Civil Engineering.
Proceedings of the Symposium of Design Applications of the Finite Element Method, Volume 1.
1981, 154p
Symp. Held at Cape Town, 12-14 Jan. 1981.

The current state of the finite element method (FEM) for static analysis is discussed. Computer aided design of circular shells is addressed. Finite strip analysis of curved plate is discussed. FEM modelling of time dependent effects of concrete is presented. Boundary integrals as an alternative to finite elements for plane elasticity problems are considered. Nonlinear analysis of reinforced concrete structures by finite element substructuring and numerical integration is also discussed.

PB82-250275 PC **E02**/MF **E02**
Cement and Concrete Association, Slough (England).
Thermal and Moisture Movements in Two Small Aerated Concrete Block Walls,
A. P. Keiller, and J. H. Brown. c1980, 26p ISBN-0-7210-1185-3, TR-535
Also pub. in ISSN-0528-3701.

The possibility of cracks occurring in aerated concrete blockwork subjected to strain gradients induced by heat and moisture has been investigated. Two small walls were used, debonded from their foundations in such a way that the only source of cracking was the through-the-thickness strain gradients. Natural sunshine and shading, and simulated sunshine were used together with the moisture shock of rendering one face of each wall, and subsequent cycles of wetting and drying. Wall movements were observed by surface strain measurements. No cracking resulted from thermal shock, from rendering or from simple wetting and drying of the walls.

PB82-250283 PC **E01**/MF **E01**
Cement and Concrete Association, Slough (England).
The Effect of Two Different Pulverized-Fuel Ashes upon the Workability and Strength of Concrete,
J. H. Brown. c1980, 21p ISBN-0-7210-1186-1, TR-536
Also pub. in ISSN-0528-3701.

This report describes tests in which different fractions of the cements in a range of concretes were replaced by pulverized-fuel ash (pfa). The effect upon workability was measured by slump, Vebe and compacting factor tests. The compressive strength of the concretes was measured both at 28 days after curing at 20C and at 14 days after curing at 50C.

PB82-250291 PC **E01**/MF **E01**
Cement and Concrete Association, Slough (England).
The Impact Resistance of External Thermal Insulation Systems,
A. P. Keiller. c1980, 20p ISBN-0-7210-1203-5, TR-538
Also pub. in ISSN-0528-3701.

Several different external thermal insulation systems, each involving the use of a cement rendering, have been tested to assess their resistance to impact. Both hard and soft body tests have been used and the results show that, with the correct choice of rendering type and thickness, all these systems can be used in normal housing situations. (Copyright (c) Cement and Concrete Association 1980.)

PB82-250309 PC **E02**/MF **E01**
Cement and Concrete Association, Slough (England).
The Influence of Section Breadth on Rotation Capacity,
S. W. Clements, W. B. Cranston, and M. G. Symons. c1980, 30p ISBN-0-7210-1194-2, TR-533
Also pub. in ISSN-0528-3701.

A series of 78 prisms of plain concrete was tested in a special test rig simulating a portion of an under-reinforced beam. The prisms were allowed to crack and the influence of the tension concrete below the neutral axis was included. Prisms having different breadth/depth ratios were tested to quantify the difference in behavior between broad 'slab'-type sections and narrow 'beam'-type sections. Two series of under-rein-

forced beams were tested to confirm the results obtained from the prism tests.

PB82-250317 PC **E02**/MF **E02**
Cement and Concrete Association, Slough (England).
The Behaviour of Cattle Slats under Biaxial Loading: A Comparison between Used and Unused Units,
J. L. Clarke. c1980, 27p ISBN-0-7210-1219-1, TR-541
Also pub. in ISSN-0528-3701.

The report describes tests on seven reinforced concrete cattle slats that had been in service for about 5 yr. The slats, which were badly cracked due to corrosion of the steel, were subjected to either vertical or combined vertical and horizontal loads. In addition, two unused slats, designed to revise specification, were tested under combined loads.

PB82-250325 PC **E01**/MF **E01**
Cement and Concrete Association, Slough (England).
Simplified Methods of Predicting the Deformation of Structural Concrete,
L. J. Parrott. c1979, 15p ISBN-0-7210-1157-8, DEVELOPMENT-3
Also pub. as ISSN-0143-1560.

Estimates of the deformation of structural concrete can be much more straightforward than many designers appreciate. Simplified methods for predicting elastic, creep, shrinkage and thermal strains in concrete are presented. The prediction methods are suitable for use in all but the most movement-sensitive designs. (Copyright (c) Cement and Concrete Association 1979.)

PB82-250333 PC **E02**/MF **E02**
Cement and Concrete Association, Slough (England).
The Interpretation of Nitrogen Sorption Isotherms on Hydrated Cements,
C. D. Lawrence. c1980, 31p ISBN-0-7210-1175-6, TR-530
Also pub. in ISSN-0528-3701.

The nitrogen sorption data on hydrated cements given in Technical Report 520 have been supplemented by work on other specimens; the whole group of nitrogen isotherms, 300 in all, are analyzed in the present report in terms of the relationship between sample preparation and isotherm shape. The 'alpha(s)' method of assessing pore structure has been adopted, use being made of a composite reference isotherm on autoclaved cement hydrate and silica TK 800. The data show that capillary condensation is absent during adsorption of nitrogen onto rapidly dried pastes, but it is present during adsorption onto slowly dried or autoclaved systems. It is deduced that slit-shaped pores are present in rapidly dried systems and that such systems are likely to be closest in structure to the undried cement pastes.

PB82-250358 PC **E02**/MF **E03**
Cement and Concrete Association, Slough (England).
The Design of Sections for Flexure and Axial Load According to CP110,
A. W. Beeby. c1978, 35p ISBN-0-7210-1134-9, DEVELOPMENT-2

This report describes a study of the methods given in CP110 for the design of sections for the ultimate limit state. Two basic methods are given in the Code: use of the parabolic-rectangular stress-strain diagram for concrete and use of the simplified rectangular stress-block. These two possibilities are compared for a variety of section types and it is shown that, while for flexure both methods are substantially identical, the simplified stress block can give over-conservative results for columns. This conservatism arises in those areas where the parabolic-rectangular stress block is most inconvenient to apply. To improve this situation, the report proposes a modification to the simplified stress-block which will give results which are normally indistinguishable from those obtained using the parabolic-rectangular diagram but remains simple to use.

PB82-250390 PC **E02**/MF **E02**
Cement and Concrete Association, Slough (England).
The Behaviour of Reinforced Concrete Blockwork Beams,
A. J. Rathbone. c1980, 26p ISBN-0-7210-1217-5, TR-540
Also pub. in ISSN-0528-3701.

Twelve single-course reinforced concrete blockwork beams with various sizes and arrangements of reinforcement have been tested in flexure. The blocks were denseaggregate, hollow, facing blocks from one manufacturer, of one strength, and were 390 X 190 X 190 mm thick. The experimental performance of the beams undeR two-point flexural loading was compared with predictions calculated by using current design procedures.

PB82-250416 PC **E01**/MF **E01**
Cement and Concrete Association, Slough (England).
The Effectiveness of Debonding Materials for Dowel Bars,
V. N. Mulajkar. c1980, 11p ISBN-0-7210-1195-0, TR-537
Also pub. in ISSN-0528-3701.

Pull-out tests have shown that the effectiveness of bond-breaking compounds applied to dowel bars in road and floor slabs decreases with increasing time between applying the compound and casting the concrete. One of the four materials tested retained its effectiveness far longer than the others. Both the results of pull-out tests and experience on site indicate that bond may also be prevented by covering the bar with a plastic sheath, a technique which has several advantages over the use of conventional bond-breaking paints.

PB82-250424 PC **E02**/MF **E02**
Cement and Concrete Association, Slough (England).
Influence of Mix Proportions and Cement Alkali Content upon Expansion due to the Alkali-Silica Reaction,
D. W. Hobbs. c1980, 34p ISBN-0-7210-1183-7, TR-534
Also pub. in ISSN-0528-3701.

The results of experimental studies to determine the influence of reactive aggregate content, mix proportions and cement alkali content upon the time to cracking and the subsequent expansion of mortar bars tested at 20C are described. The reactive aggregate used in the study was Beltane opal rock.

PB82-251166 PC **E03**/MF **E03**
Cement and Concrete Association, Slough (England).
A Proposal for Changes to the Basis for the Design of Slabs,
Technical rept.,
A. W. Beeby. c1982, 41p TR-547, ISBN-0-7210-1254-X
Also pub. in ISSN-0528-3701.

This report reviews a number of illogicalities which have developed in the sections of British Codes dealing with the design of reinforced concrete slabs. It is proposed that these inconsistencies can be resolved if slabs are designed for the single loading case of all spans or panels carrying their full design load simultaneously. In some circumstances, this leads to much less conservative designs than are currently permitted and the majority of the report is concerned with justifying this proposal.

PB82-251174 PC **E06**/MF **E06**
Cement and Concrete Association, Slough (England).
An Investigation of the Beam Impact Problem.
Technical rept.,
G. Hughes, and D. M. Speirs. c1982, 120p TR-546, ISBN-0-7210-1246-9
Also pub. in ISSN-0528-3701.

This report describes 80 impact tests on pin-ended reinforced concrete beams and 12 tests on simply supported reinforced concrete beams. For each test, the impact force history and beam displacements were measured. Various models of the impact are discussed. The simple beam vibration model is shown to be applicable over the test range, and the importance of two parameters, the mass ratio and the pulse ratio, is recognized. The results of impact tests by other investigators, on both reinforced and prestressed concrete beams, are also shown to be consistent with the simple beam solution.

PB82-251182 PC **A02**/MF **A01**
British Carbonization Research Association, Chesterfield (England).
Poly(methyl methacrylate)-Modified Road Tars for Surface Dressing Applications. Part 1: Laboratory Investigation. Part 2: Full-Scale Surface-Dressing Trial.
Carbonization research rept. (Final).
Jul 78, 25p CARBONIZATION/RR-50

The purpose of the experiments was to develop polymer-modified road tars based on the addition of poly(methyl methacrylate) to low-temperature tar. Scrap 'Perspex' turnings and selected commercial grades of methyl-methacrylate copolymers and homopolymers were added to a low-temperature tar from Coalite and Chemical Products Ltd. It was found that 'Perspex' turnings and the selected 'Diakon' copolymer grades could not be satisfactorily incorporated in the low-temperature tar. Two homopolymers gave good blends; a tar containing 1% Acrylic Granules DP 300 exhibited a high degree of elasticity, improved resistance to low temperature and impact, and could be sprayed through a conventional sprayer-jet at normal temperatures and pressures. A full-scale surface-dressing trial was carried out in September 1977 on the B6013 at Higham, Derbyshire, using tar containing Acrylic Granules DP 300. The polymer-modified binder was prepared on this larger scale with only minor difficulty and was successfully sprayed through a normal spray-bar. The surface dressing gave good performance in service.

PB82-251711 PC **E02**/MF **E03**
Cement and Concrete Association, Slough (England).
Bond Strength of Deformed Bars in Tension.
Technical rept.,
G. C. Reynolds. c1982, 26p TR-548, ISBN-0-7210-1255-8
Also pub. in ISSN-0528-3701.

Thirty-nine beams have been tested giving results which agree well with a theoretical lower bound to bond strength. It is found that laps and single-bar anchorages behave similarly and that the contribution of transverse reinforcement may not be related to the yield stress of the reinforcement. A change is recommended in the CP 110 bond requirements for deformed bars.

PB82-252222 PC **A02**/MF **A01**
British Carbonization Research Association, Chesterfield (England).
A Surface-Dressing Trial with Tar Containing Butadiene-Acrylonitrile Rubber on the B5305 at Sebergham, Cumbria.
Carbonization research rept. (Final).
Jul 78, 15p CARBONIZATION/RR-49

The nitrile rubber-modified tar, of 42 + or - 1.5 EVT, used in this trial, contained approx. 1.75% of rubber solids from Breon 1562 latex, which was slightly higher than earlier laboratory-prepared material (BCRA/CRR-34). The modified tar had a ductility-tenacity test result of 2.74 W/L which was unexpectedly high. The tar was sprayed on a total of 1120m of the B5305 and B5299 roads within one day. The material was satisfactorily applied and the surface dressing gave good performance and was still in good condition 5 months later.

PB82-252495 PC **A02**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Surface Dressing: Testing Binder Distributors for Uniformity of Transverse Distribution,
N. Wright. c1982, 15p TRRL-SUPPLEMENTARY-737

A revised method is proposed for the testing of binder distributors for uniformity of transverse distribution of binder: it uses a light fuel oil with physical properties at low temperatures equivalent to those of surface dressing binders at normal elevated spraying temperatures. The temperature of test is reduced from around 150C to 40C and efficiency of testing is improved because the operatives carrying out the tests work in a less dangerous environment.

PB82-252503 PC **A03**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
The Use of Pulverised Fuel Ash in Lean Concrete Roadbases. Part 1. Laboratory Studies,
R. E. Franklin, W. E. Gibbs, and P. T. Sherwood. c1982, 37p TRRL-SUPPLEMENTARY-736
Also pub. in ISSN-0305-1315.

This report describes the first part of a series of investigations to assess the potentialities of PFA for improving the properties of lean concrete roadbases. The work showed that by adjusting the proportions of PFA, cement and water an ash-modified lean concrete can be produced that will have strength properties comparable with those of normal lean concrete at any given age. However, the addition of PFA modifies the rate of

gain of strength so that an ash-modified lean concrete does not completely emulate the properties of normal lean concrete. In general the addition of ash leads to lower early strengths and higher long term strengths than are obtained with normal lean concrete.

PB82-253352 PC **A03**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Trials of Buried Joints and Surfacings on a Composite Motorway Viaduct.
Final rept.,
A. R. Price. c1982, 38p TRRL/LR-1023
Also pub. in ISSN-0305-1293.

Buried joints on steel/concrete composite structures carrying heavy traffic can be prone to premature failure. This is due principally to the inability of the surfacing over the joint to accommodate the relatively large movements due to traffic and thermal variations. Trials were instigated using rubberized, high penetration index and normal asphalt surfacings, with two versions of a buried joint system to bridge the expansion gap. Measurement of the horizontal, vertical and rotational movements were made at all the joints and at selected bearings.

PB82-253808 PC **E02**/MF **E02**
Cement and Concrete Association, Slough (England).
Design of Floors on Ground.
Technical rept.,
J. W. E. Chandler. c1982, 23p TR-550, ISBN-0-7210-1257-4
Also pub. in ISSN-0528-3701.

The report proposes two basic methods of floor-slab design. One utilizes the modified equations of Westergaard and is used for wheel and rack loading; the other is based upon a discrete element analysis and is used for uniform loading. The problem of more than one load inducing stress at any point is accommodated in the design.

PB82-254533 PC **A03**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Analysis of Fresh Concrete: Repeatability and Reproducibility by the Rapid Analysis Machine.
Final rept.,
A. C. Edwards, and G. D. Goodsall. c1982, 28p TRRL/SR-714, TRRL-SUPPLEMENTARY-714
Also pub. in ISSN-0305-1315.

Measurements taken during highway engineering involve inaccuracies that are inevitable because of the method of measurement. When setting tolerances in a specification, it is important that the permitted tolerances should make allowances for such inaccuracies. This report describes work carried out on a motorway site to estimate the precision, i.e., repeatability and reproducibility, of the determination of the cement content of fresh concrete when using the Rapid Analysis Machine.

PB82-254558 PC **A02**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Analysis of Fresh Concrete: Repeatability and Reproducibility by the Pressure-Filter Method.
Final rept.,
A. C. Edwards. c1982, 15p TRRL/SR-715, TRRL-SUPPLEMENTARY-715
Also pub. in ISSN-0305-1315.

As part of a study of the precision of on-site analysis of fresh concrete, the Laboratory had previously investigated the use of the Rapid Analysis Machine (TRRL/SR-714). This report describes the work carried out on a road construction site to estimate the precision of the cement content determination using the other main technique, the pressure-filter method.

PB82-873100 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Sandwich Structures. November, 1975-August, 1982 (Citations from the Engineering Index Data Base).
Rept. for Nov 75-Aug 82.
Aug 82, 239p
Supersedes PB81-858375.

This bibliography contains citations concerning sandwich structure technology relative to design, manufacture, testing and applications. Core material variations, reinforcing agents, adhesives, and bonding techniques for sandwich laminate construction of such materials as plastics, metals and alloys, and wood are considered. Mathematical modelling relative to such considerations as structural analysis, load capacity and other forms of strength is presented as well as problems, defects and possible solutions. (This updated bibliography contains 252 citations, 52 of which are new entries to the previous edition.)

13D. Containers and Packaging

DE82008123 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Dynamic Response of Containment Vessels to Blast Loading.
R. R. Karpp, T. A. Duffey, T. R. Neal, R. H. Warnes, and J. D. Thompson. 1982, 7p LA-UR-82-344, CONF-820516-5
Contract W-7405-ENG-36
Joint conference on experimental mechanics, Honolulu, HI, USA, 22 May 1982.

The dynamic response of steel, spherical containment vessels loaded by internal explosive blast was studied by experiments, computations, and analysis. Instrumentation used in the experiments consisted of strain and pressure gauges and a velocity interferometer. Data were used to rank the blast wave mitigating properties of several filler materials and to develop a scaling law relating strain, filler material, and explosive energy or explosive mass. (ERA citation 07:044349)

PB82-873431 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Universal Product Codes. 1975-August, 1982 (Citations from the International Information Service for the Physics and Engineering Communities Data Base).
Rept. for 1975-Aug 82.
Aug 82, 103p
Supersedes PB81-880759.

This bibliography contains citations concerning the utilization of the universal product codes for product labelling and identification. Scanning and computer memory devices which are employed to decifer such product identification information as manufacturer, product name and prices from the bar code are discussed relative to equipment manufacturers, system mechanics, maintenance, equipment innovations and market trends. Medical, postal, department store, mail-order, library science and institutional applications are also discussed. (This updated bibliography contains 108 citations, 20 of which are new entries to the previous edition.)

13F. Ground Transportation Equipment

DE82008437 MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Special Coupler-Pin Development for Measuring Railroad-Locomotive Drawbar Forces.
J. T. Gunn, T. Lauritzen, L. Resnick, D. T. Scalise, and J. Koper. Feb 82, 7p LBL-14024, CONF-820516-7
Contract W-7405-ENG-48
Joint conference on experimental mechanics, Honolulu, HI, USA, 22 May 1982.
Available in microfiche only.

A new method has been developed for measuring the drawbar dynamic forces exerted by a railroad locomotive while pullings its payload. Such data are necessary to determine the effect of train handling on fuel economy and on locomotive performance. Previous methods modified the bulky locomotive coupler for use as the force-sensor. This resulted in expensive devices which were difficult to transport because of their bulk and which had strain-gage exposures vulnerable to damage in the severe environment of railroad operations. The new method uses a specially-designed coupler pin as the force-sensor. In this special pin, the shear-forces (imposed by the locomotive drawbar) are first transformed into bending stresses and then measured by strain-gages located inside small longitudinal holes in the shear pin. This results in important advantages over the previous methods; the new sensor is much less expensive, more easily portable (30 vs. 400 pounds) and more reliable and less susceptible to damage. A prototype pin has been built and successfully tested in the laboratory at full operating load and the load resolution has met design specifications. This paper describes the design, construction, and testing of the pin.

DE82011524 MF **A01**
Oak Ridge National Lab., TN.
Data-Based Simulator for Predicting Vehicle Fuel Consumption.
A. B. Rose, J. N. Hooker, G. F. Roberts, and J. Hodgson. 1982, 40p CONF-820203-4
Contract W-7405-ENG-26
Society of Automotive Engineers international congress and exposition, Detroit, MI, USA, 22 Feb 1982, Portions of this report are illegible.
Available in microfiche only.

A hybrid system, combining on-road testing and statistical modeling, has been developed which permits calculation of a vehicle's fuel consumption over any driving cycle. An instrumentation system permits collection of the necessary on-road and laboratory test data within a relatively short period of time and, once calibrated, the model requires considerably less CPU time for execution than engineering simulation models while providing results within 5% of on-road measured fuel uses. The model has been run in conjunction with optimization routines for deriving minimum fuel use strategies for a variety of common driving maneuvers. Results for a 1979 Ford Fairmont wagon are given. (ERA citation 07:047219)

DE82012216 MF **A01**
Lawrence Livermore National Lab., CA.
Route Profile Analysis to Determine Suitability of Electric Postal-Delivery Vehicles.
C. E. Walter, M. K. Kong, and D. J. Mullenhoff. 14 Dec 81, 15p UCRL-86707, CONF-820531-1
Contract W-7405-ENG-48
32. Institute for Electrical and Electronics Engineers vehicular technology conference, San Diego, CA, USA, 23 May 1982.
Best available copy from document source. Available in microfiche only.

An instrumentation system and computer program were developed that allow the US Postal Service to determine which post ' routes are suitable for electric delivery vehicles. The instrumentation system provides route data. The route data and electric vehicle characteristics are used in the computer program to calculate vehicle energy and power requirements for the particular route. The performance characteristics of electric vehicles are contained in an input data file to the computer program. The instrumentation system is designed for use during normal mail delivery with gasoline-powered vehicles. The system is powered by the vehicle battery. Minimum operator interaction and inexpensive maintenance-free sensors are featured in the design. Route grade is determined from a pendulum measurement corrected for vehicle acceleration. Acceleration is determined from a measurement of the distance traveled. The value of road grade obtained in this manner is in excellent agreement with civil survey data. The distance transducer utilizes an electro-optical sensor and a rotating disk driven by the speedometer gear to provide a resolution of 3 mm. A microprocessor provides timing and data management. Data are recorded on a cassette tape. (ERA citation 07:044122)

N82-27740/1 PC **A02**/MF **A01**
Ferodo (Pty) Ltd., Durban (South Africa).
Sources of Brake Squeal in Motor Vehicles.
R. K. Goatley. 1981, 12p
Presented at the Intern. Symp. On Transportation Noise, Pretoria, 21-23 Oct. 1981.

Squeal is identified as a frictional vibration dependent on the coefficient of friction of the lining and its contact geometry. The mass and stiffness of related parts such as drum, shoe, and caliper, are contributory factors. Their influence on squeal in both disc and drum brake installations is discussed. Practical solutions to the problem are considered within limitations imposed by brake performance requirements.

N82-27742/7 PC **A02**/MF **A01**
Volkswagenwerk A.G., Wolfsburg (Germany, F.R.).
Studying Sources of Brake Noise with Coherent Optical and Holographic Measuring Techniques.
A. Felske. 1981, 16p
Presented at the Intern. Symp. On Transportation Noise, Pretoria, 21-23 Oct. 1981.

The analysis of vibrations on squealing brake systems by optical measuring techniques is described. Laser doppler velocimetry, image derotation and holographic interferometry are considered. The localization of noise sources and quantitative measurement of elaborated vibration centers by the laser doppler technique on rotating and nonrotating components is described. Applications of these methods to prevent brake squeal of disk and drum brakes are demonstated.

N82-27866/4 PC **A02**/MF **A01**
Goodyear International Tire Technical Center, Luxembourg.
Tire/Road Noise.
G. J. Kind. 1981, 20p
Presented at the Intern. Symp. On Transportation Noise, Pretoria, 21-23 Oct. 1981.

The different mechanisms that are at the origin of tire to surface noise are discussed. Various tire noise measurement and analysis techniques are described and analysed regarding their correlation to subjective testing. Means to reduce tire noise are proposed and discussed in the context of other important tire properties.

N82-27872/2 PC **A02**/MF **A01**
National Inst. for Transport and Road Research, Pretoria (South Africa).
Traffic Noise Generation of Asphalt Road Surfaces.
A. T. Visser, and R. N. Walker. 1981, 14p
Presented at the Intern. Symp. On Transportation Noise, Pretoria, 21-23 Oct. 1981.

The noise generating properties of different asphalt road surfacing types are considered. Noise levels at low and high speeds were investigated.

N82-28224/5 PC **A05**/MF **A01**
Martin Marietta Aerospace, Denver, CO. Denver Div.
Track Train Dynamics Analysis and Test Program: Locomotive Dynamic Characterization Summary.
Final Report.
R. L. Berry. Apr 82, 83p NASA-CR-162027, NAS 1.26:162027
Contract NAS8-29882

Locomotive mechanical characteristics, track perturbations, and operational characteristics involving experimentally determined suspension system parameters are analyzed. Suspension bearings, shock absorbers, pads, and two- and three- axle trucks are comparatively evaluated with respect to locomotive design.

PB82-250127 PC **A05**/MF **A01**
Wyle Labs./Wyle Research, Arlington, VA.
Evaluation of a Simulated Road Texture for the Testing of Tire/Road Noise.
Interim rept.,
Eric Stusnick, and Kenneth J. Plotkin. Mar 82, 84p WR-82-3, EPA-550/9-82-332
Contract EPA-68-01-6243

As part of a project to study tire/road noise, a laboratory roadwheel facility was equipped with replica road surfaces. The replica surfaces, of a design first developed by Dunlop, Ltd., consisted of fiberglass and epoxy resin shells clamped to the roadwheel. The outer surface of each shell was molded from a rubber impression taken from a real road surface, thus replicating the texture. To evaluate the effect of pavement texture, and to establish the realism of the replica surfaces, a series of near-field measurements of noise from four heavy truck tires were made on the replica surfaces and on moving tests on the real surfaces. Moving tests on a flat steel surface were also made. Data from these same tires on a smooth steel roadwheel were available from a previous program.

PB82-250150 PC **A04**/MF **A01**
Wyle Labs./Wyle Research, Arlington, VA.
A Unified Set of Models for Tire/Road Noise Generation.
Interim rept.,
Kenneth J. Plotkin, and Eric Stusnick. Jul 81, 63p WR-81-26, EPA-550/9-82-345
Contract EPA-68-01-6243

A set of theoretical models has been prepared which describes the noise generated by tire/road interaction. The mechanisms considered are air pumping and carcass vibration. The models begin with a set of thin shell equations describing the motion of the belt of a radial ply tire, as derived by Bohm ('Mechanisms of the Belted Tire', Ingeniur-Archiv, XXXV, 1966). Structural quantities required for these equations are derived from material properties of the tire. The rolling shape of a tire is computed from the steady-state limit of these equations. Air pumping (monopole radiation from tread voids) is calculated by assuming that tread elements move passively on the deformed tire. Vibrational response of the tire is treated by the full time-dependent shell equations. The force input at the tire/road interface is calculated on the basis of tread geometry and distribution of contact patch pressure. This input is physically equivalent to the impulse distribution models widely used in the tire industry for tread pitch randomization. Subsequent radiation of sound is calculated by a Raleigh integral.

PB82-252651 PC **A03**/MF **A01**
Transportation Research Board, Washington, DC.
Cleaning Transit Buses: Equipment and Procedures.
Final rept.,
Peter E. Ward. Mar 82, 49p TRB/NCTRP/SYN-1, ISBN-0-309-03411-6
Contract DTUM60-81-C-72012
Library of Congress catalog card No. 82-50483. Also pub. in ISSN-0732-1856. Report on National Cooperative Transit Research and Development Program, Synthesis of Transit Practice.
Paper copy also available from Transportation Research Board, 2101 Constitution Ave., NW, Washington, DC 20418.

This synthesis will be useful to transit administrators, maintenance managers, and others concerned with bus cleaning operations. Detailed information is presented on procedures, equipment, and materials used in cleaning transit buses. Transit buses must be clean to be attractive to passengers. Practices used in cleaning bus interiors and exteriors vary greatly among transit agencies. This report of the Transportation Research Board includes information on equipment and procedures currently used for cleaning buses.

PB82-252966 PC **A04**/MF **A01**
Booz-Allen and Hamilton, Inc., Bethesda, MD.
Review of the Massachusetts Vehicle Emissions Test Equipment.
Final rept.
Jan 82, 73p EPA460/3-82-001
Contract EPA-68-02-3507

This report involved reviewing of the Massachusetts draft computerized emission analyzer specification and then developing a final equipment specification, as well as specifications for a quality assurance (QA) program, a recommended procurement schedule and a set of proposal evaluation criteria. An overview of the study objectives, methodology and results is provided. Also included are three technical appendices containing documentation prepared during the course of the study, final equipment specifications and recommended proposal evaluation procedures.

PB82-252974 PC **A05**/MF **A01**
Radian Corp., Austin, TX.
Guidance on Data Handling and Analysis in an Inspection/Maintenance Program.
Final rept.
Dec 81, 93p RAD-81-240-016-0713, EPA-460/3-82-007

The report first discusses various uses of data in an I/M program. Details are then presented on statistical analysis and sampling techniques along with ways of presenting the data. The report also contains a discussion of data collection and handling techniques, including provisions for quality control.

PB82-253311 PC **A03**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Jury Evaluation of Differences in Weight, Length and Other Characteristics of Articulated Lorries.
Final rept.,
L. Huddart. c1982, 36p TRRL/LR-1035
Also pub. in ISSN-0305-1293.

An experiment was carried out on a laboratory test track in which members of the public were asked to make assessments of the environmental disturbance from a number of articulated vehicles of differing weights and dimensions. For accelerating vehicles similar in appearance and noise emissions, weighing between 12 and 38 tons, weight differences of 6 tons or greater were correctly detected by the majority of subjects, but this was not the case for comparisons involving vehicles of gross weights of 32 to 44 tons, in which the vehicles themselves also differed. Differences in overall length of the order of 0.5 meters were not reliably detected.

PB82-254335 PC **A04**/MF **A01**
Radian Corp., Austin, TX.
Guidance on Quality Control for Inspection/Maintenance Programs.
Final rept.
25 Jun 82, 62p RAD-82-240-016-17-12, EPA-460/3-82-006

This report provides guidance on the areas that need to be addressed in a quality control plan and on recommended quality control procedures that can be used in the quality control program. This guidance is important because of the emissions performance warranty provisions. The following area discussed in this report include: (1) the quality control plan and procedures that inspection facilities should be required to use to insure that analyzers maintain accuracy. (2) the quality control procedures used to assure the test procedures are performed correctly. (3) the quality control procedures used during auditing by administrating agency personnel and (4) the importance and role of quality control elements in providing overall quality assurance in the Inspection/Maintenance program.

PB82-254350 PC **A07**/MF **A01**
Illinois Univ. at Chicago Circle. Energy Resources Center.
Prospects for the Electric Vehicle in the Chicago Area - 1980-2000.
Final rept.,
Daniel S. Merilatt, Paul S. Galen, Steven D. Jansen, Slim Soeoet, and P. V. Sudhindra. Jul 81, 134p IINR-81/24

This report explains the market adopting potential for electrically powered passenger vehicles (EVs) and the impacts associated with adopting scenarios are examined. The market analyzed is the Chicago metropolitan area from now through the year 2000. Estimates of the size of the maximum potential EV adopter population are derived from an analysis of demographics, housing characteristics and automobile use patterns. A dynamic relative cost model is used to analyze the various cost components of the EV and a comparable internal combustion engine vehicle to yield the year of cost parity between the two.

13G. Hydraulic and Pneumatic Equipment

PAT-APPL-6-368 933 PC **A03**/MF **A01**
Department of the Navy, Washington, DC.
Controlled Gas Generator System.
Patent Application,
Don W. Caudy, Donald J. Hackman, John R. Myers, and Robert T. Hoffman. Filed 16 Apr 82, 27p AD-D009 565/3
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A controlled gas generator system is provided which has a reaction chamber, the reaction chamber having top and bottom ends. A bed of reactant material is disposed within the chamber intermediate its tops and bottom ends. Liquids are located witin the chamber, one of the liquids being nonreactive with the reactant. The liquids are dissimilar in specific gravity so that the liquids interface substantially along a cross-sectional plane of the chamber. With this arrangement, gas will be produced when the interfacial plane is vertically disposed on one side of the bed of reactant material, and gas will not be produdcd when the interfacial plane is vertically disposed on an opposite side of the bed of reactant material. Provision is made for selectively ad-

justing the vertical position of the interfacial plane above or below the bed of reactant material so that gas can be selectively generated. (Author)

PAT-APPL-6-371 142 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Instantaneous Start and Stop Gas Generator.
Patent Application,
Don W. Caudy, Donald J. Hackman, Robert T. Hoffman, and Dale G. Uhler. Filed 23 Apr 82, 10p
AD-D009 577/8
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A gas generator is provided which can be selectively switched between reaction and nonreaction modes. The gas generator includes a reaction chamber which has top and bottom ends. The chamber contains reactive and nonreactive liquids, the nonreactive liquid having a greater specific gravity than the reactive liquid. A solid reactant member is provided. A device is provided for projecting the solid reactant member through the bottom of the chamber, thence through the nonreactive liquid, and thence into the reactive liquid for generating gas. Further, a device is provided for withdrawing the solid reactant member from the reactive liquid into the nonreactive liquid for terminating the generation of gas. (Author)

PATENT-4 291 395 Not available NTIS
Department of the Army, Washington, DC.
Fluid Oscillator.
Patent,
Allen B. Holmes. Filed 7 Aug 79, patented 22 Sep 81, 6p AD-D009 548/9, PAT-APPL-6-064 451
Supersedes PAT-APPL-6-064 451, AD-D007 464.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A telemetry system is disclosed which utilizes a fluid feedback oscillator in conjunction with a flow restricting device in order to generate pulses in a fluid. Means are provided to turn the oscillator on or off or to vary the frequency of oscillation, thereby permitting the transmission of information by means of the fluid pulses. (Author)

PATENT-4 300 596 Not available NTIS
Department of the Army, Washington, DC.
Adjustable Parallel Fluidic Resistor Bank.
Patent,
John F. Burke. Filed 30 Aug 79, patented 17 Nov 81, 6p AD-D009 542/2, PAT-APPL-6-070 772
Supersedes PAT-APPL-6-070 772.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A fluidic resistor module, including resistor channels connected in parallel between two common ports, is permanently adjustable by deforming the cross sections of the individual channels by externally applied forces. The channels are formed on the interior surface of an exterior plate of a bonded plate module, and the indicia indicating the locations of channels are formed on the exterior surface of the plate. A pair of adjustable resistor modules are used to null opposed fluidic bias means in a laminar fluidic device. (Author)

PATENT-4 323 991 Not available NTIS
Department of the Army, Washington, DC.
Fluidic Mud Pulser.
Patent,
Allen B. Holmes, Stacy E. Gehman, and Maurice F. Funke. Filed 12 Sep 79, patented 6 Apr 82, 6p AD-D009 539/8, PAT-APPL-6-074 636
Supersedes PAT-APPL-6-074 636, AD-D007 467.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A liquid telemetry system is disclosed useful for transmittimg data through a fluid body by means of pulses in the fluid. To generate the pulses in the fluid the system utilizes a bi-stable fluid amplifier in conjunction with a vortex valve. Control input signals direct the flow of fluid from the bi-stable amplifier into the vortex valve in such manner as to selectively impede the flow of fluid through the vortex valve. The resulting changes in fluid flow rates generate pulses within the fluid body. (Author)

PATENT-4 326 559 Not available NTIS
Department of the Army, Washington, DC.
Fluidic Force Transducer.
Patent,
Tadeusz M. Drzewiecki. Filed 25 Apr 80, patented 27 Apr 82, 6p AD-D009 535/6, PAT-APPL-6-143 698
Supersedes PAT-APPL-6-143 698.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The patent describes a fluidic accelerometer and electromagnetic transducer formed from a plurality of vertical laminations having a nozzles, a pair of outlets for receiving nozzle fluid and a flexible member as an extension of one of the laminations which forms a vertical wall of said nozzle extending into a chamber between the nozzle and the outlets. The flexible member is responsive to acceleration or electromagnetic forces transverse the nozzle centerline to vary the proportion of nozzle fluid received by each outlet. The flexible member is separated from the horizontal walls of the chamber by a selected small distance to create sufficient viscous shear force to effectuate damping. (Author)

PATENT-4 328 699 Not available NTIS
Department of the Army, Washington, DC.
Flueric Density and Force Sensor.
Patent,
Tadeusz M. Drzewiecki. Filed 23 Jun 80, patented 11 May 82, 5p AD-D009 532/3, PAT-APPL-6-161 793
Supersedes PAT-APPL-6-161 793, AD-D007 910.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Density of a sample or its concentration are sensed by a fluidic device having a nozzle with a divider for emitting the sample and a reference fluid as layers of a single laminar jet. The deflection of the jet in a fixed force field is sensed as an indicator of density or concentration. The same device can measure acceleration transverse to the nozzle axis or attitude in a fixed force field as a function of sensed jet deflection. The sensitivity of the acceleration and attitude sensor is a function of the density of the two selected fluids used in the layered laminar jet. (Author)

PB82-254368 PC **A07**/MF **A01**
Lund Inst. of Tech. (Sweden). Machine Elements Div.
Transactions of Machine Elements Division; On Hydrodynamic Torque Converters,
Sven Andersson. 1982, 141p

Contents:
The flow through a turbine;
Flow at turbine entrance;
The streamline curvature method;
A finite element method;
The flow in a torque converter;
Test of the calculation methods.

13H. Industrial Processes

AD-A117 456/4 PC **A03**/MF **A01**
New Jersey Inst. of Tech., Newark. Dept. of Electrical Engineering.
Mercury Cadmium Telluride Sputtered Target Research.
Final technical rept.,
Roy H. Cornely, Lawrence Suchow, and Robert Bourne. 29 Jun 82, 48p ARO-14907.2-PH
Grant DAAG29-78-G-0066

Techniques for fabricating large-area targets by pressing either a physical mixture of HgTe and CdTe powder particles (7 micron average size) or a similar-size powder ground from (Hg,Cd)Te polycrystalline ingots were developed. Sixty SEM microphotographs of regions of r.f. triode-sputtered targets, sputtered to different erosion depths, revealed topographical changes and dynamic erosion processes, e.g. cone formatior. and deteriotion. The sputter-protect theory for cone formation due to larger, slow-sputtering particles (10-50 microns) was demonstrated. Distinctly different cone angle distributions for HgTe and CdTe particles were measured; x-ray powder patterns revealed fusion of smaller HgTe and CdTe particles.

AD-A117 503/3 PC **A06**/MF **A01**
National Materials Advisory Board (NRC), Washington, DC.
Advanced Joining Technology.
Final rept.
1982, 103p Rept no. NMAB-387
Contract MDA903-78-C-0038

This report presents a review of the science of joining and the state of technology for joining similar and dissimilar metals to one another, ceramics to ceramics, and metals to ceramics. With respect to ceramics, mechanical joints and metallurgical bonds are considered. Important emerging technologies and advanced joining techniques are discussed, and some of the critical gaps in fundamental joining knowledge that limit progress are identified. Future research is recommended to form a basis for improved understanding of the joining process in all its many forms, and to develop new and improved joining methods to meet future design challenges. The metal-to-metal combustions will continue to be the major joining assembly concern of the Department of Defense as it is in industry. (Author)

AD-A117 542/1 PC **A05**/MF **A01**
Martin Marietta Aerospace, Orlando, FL.
Manufacturing Techniques of Large Scale Hybrid Microelectronics.
Final technical rept. Oct 78-Oct 81,
Lee Mirth, and Connie Gill. Nov 81, 92p Rept no. OR-16962
Contract DAAK40-78-C-0251

The purpose of this Manufacturing Methods and Technology (MM&T) contract was to develop the manufacturing technology necessary to design, fabricate, test, and rework large scale hybrid (LSH) microcircuits with cost effective yields and to evaluate the capability of such assemblies to withstand extreme environments. Processing data and backplate reinforcement information is included. (Author)

AD-A117 772/4 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
A Novel Anisotropic Dry Etching Technique.
Journal article,
Michael W. Geis, George A. Lincoln, Nikolay N. Efremow, and William J. Piacentini. 29 May 81, 5p MS-5634A, ESD-TR-82-026
Contract F19628-80-C-0002
Pub. in Jnl. of Vacuum Science and Technology, v19 n4 p1390-1393 Nov/Dec 81.

No abstract available.

AD-A117 881/3 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Application of Approximately 100 A Linewidth Structures Fabricated by Shadowing Techniques.
Journal article,
Dale C. Flanders, and Alice E. White. 1981, 6p MS-5656, ESD-TR-82-027
Contract F19628-80-C-0002
Pub. in Jnl. of Vacuum Science and Technology, v19 n4 p892-896 Nov/Dec 81.

No abstract available.

DE82009057 PC **A02**/MF **A01**
Kayex Corp., Rochester, NY.
Development of Advanced Czochralski Growth Process to Produce Low Cost 150 Kg Silicon Ingots from a Single Crucible for Technology Readiness. Fourth Quarterly Progress Report, July 1-September 30, 1981.
1981, 18p DOE/JPL/955733-4
Contract NAS-7-100-955733

Process development under the extended program was limited to one crystal growth run. The slight twisting of the crystal (corkscrewing) experience during previous runs continued and will require further investigation. Sensor development resulted in a revised dip temperature sensor viewing angle to minimize spurious reflections from the melt. The Kayex-Hamco Automatic Grower Logic computer system was integrated to the Mod CG2000 and two test crystals grown.

These runs successfully demonstrated the automatic control functions of the AGL system. The analytical task included trial measurements with the gas chromatograph portion of the Furnace Atmosphere Analysis system. The water and oxygen analyzers will be received next quarter. Also, automated sampling and curve integration will be added to the gas chromatograph for automated and more accurate readings. An economic analysis based on present Mod CG2000 process parameters is presented. The present throughput is 1.78 kg per hour. A comparison to 2.5 kg per hour cost shows that a 22% reduction in cost results when the throughput is increased. (ERA citation 07:042797)

DE82012526 PC **A02**/MF **A01**
General Electric Co., St. Petersburg, FL. Neutron Devices Dept.
Auger Evaluation of Plasma Cleaning of Ceramics and Metals.
G. Moore. 2 Apr 82, 11p GEPP-TIS-636
Contract AC04-76DP00656
Portions of document are illegible.

Low energy argon ion plasma cleaning is sometimes used to remove light contamination from components used in vacuum devices. Auger electron spectroscopic and x-ray photo electron spectroscopic evaluations of plasma etched ceramics, molybdenum, Rodar and stainless steel indicate that thin films of carbon and other surface contaminants are readily removed from ceramics and metals by the plasma cleaning process. Auger results show that plasma cleaning leaves no residue and cleans surfaces as effectively as hydrogen firing. However, a thin, clean oxide is formed on some metals that have been plasma cleaned.

N82-27483/8 PC **A02**/MF **A01**
Societe Nationale Industrielle Aerospatiale, Les Mureaux (France).
Industrial Applications Relating to Superplastic Forming of TA6V Titanium Alloy: Manufacturing of Hemispherical Banks and Truncated Cones with Internal Flanges.
J. Chanteranne. 1981, 5p SNIAS-821-422-113
In French; English Summary. Presented at 24TH Instn Coll. De Metallurgie, Saclay, France, Jun. 1981.

Superplastic forming processes for TA6V which enable an economy of this material were developed. The forming of hemispherical blanks for satellite tanks is explained. After stabilizing the material in an oven at 925 C, two plates welded together around the edges are expanded within a mold by forcing gas between them. A surface elongation of 250% is obtained, achieving a precise form of good metallurgical and mechanical quality. This process was modified in order to manufacture deep blanks (400% surface elongation) of truncated form with local internal margins that can be machined into flanges. A material mass savings on the order of 40% in comparison to die stamping is reported.

N82-27752/6 PC **A02**/MF **A01**
Societe Nationale Industrielle Aerospatiale, Les Mureaux (France).
Laser Welding of Metallic Sandwich Structures (Norsial) Soudage Laser de Structures Sandwich Metalliques Norsial.
1981, 22p SNIAS-821-422-114
Text in French.

Manufacturing of Norsial (trademark) sandwich structures is described. An electrical resistance welding process whereby metal sheet is welded to a corrugated center, or stacks of corrugated sheet, is outlined. In order to cut production costs, introduction of laser welding in place of resistance welding is considered. A laser welding machine was developed. Rigid Norsial panels were produced, using this machine and numerical control. Compression test results show that laser welded Norsial panels have the same, or better, mechanical properties (structural reliability) as conventionally produced ones.

PAT-APPL-6-284 313 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Pasadena, CA. Pasadena Office.
Method and Apparatus for Producing Concentric Hollow Spheres.
Patent Application,
T. G. Wang, and D. D. Elleman. Filed 17 Jul 81, 15p
N82-25401/2, NASA-CASE-NPO-14596-2
Contract NAS7-100
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Hollow spheres with precisely concentric inner and outer spherical surfaces are formed by applying vibrations to a nonconcentric hollow sphere while it is at an elevated temperature at which it is fluid or plastic, the vibrations producing internal flos which cause the inner and outer surfaces to become precisely concentric. Concentric spheres can be mass produced by extruding a material such as glass or metal while injecting a stream of gas into the center of the extrusion to form a gas filled tube. Vibration are applied to the extruded tube to help break to form spherical inner and outer surfaces by reason of surface tension, and the continuing application of vibrations causing these surfaces to become concentric.

PAT-APPL-6-284 848 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
A Method for Forming Gamma-Boron.
Patent Application,
Kaplesh Kumar, and Dilip K. Das. Filed 20 Jul 81, 11p AD-D009 580/2
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of aplication available NTIS.

This report describes a plasma-spray technique using rapid temperature quenching transforms commercially available beta-rhombohedral boron in powder form into thick, dense wafers of crystalline gamma-tetragonal boron.

PAT-APPL-6-325 933 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Pasadena, CA. Pasadena Office.
Controlled In-situ Etchback.
Patent Application,
A. C. Seabaugh, and R. J. Mattauch. Filed 30 Nov 81, 16p N82-25995/3, NASA-CASE-NPO-15625-1
Contract NAS7-100
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A controlled in situ etch-back technique is in which an etch melt and a growth melt are first saturated by a source-seed crystal is described. Etchback of a substrate then takes plce by the slightly undersaturated etch melt. This is followed by liquid phase epitaxial growth melt, which is slightly supersaturated.

PAT-APPL-6-370 233 PC **A03**/MF **A01**
Department of the Air Force, Washington, DC.
Low Cost Thermal Protection System Processing.
Patent Application,
Robert V. Kromrey. Filed 21 Apr 82, 26p AD-D009 573/7
Portions of this document are not fully legible.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

In accordance with the present invention there is provided an improved method for spin casting which comprises the steps of rotating an elongated cylindrical body at a desired speed of rotation about its longitudinal axis, applying an extrudable uncured material as a continuous stream in helical fashion, with each newly applied portion being continuous to the next immediately applied portion, from one selected point in the body to another selected point in the body, continuing to rotate the body until the material is leveled between the selected points, and at least partially curing the material while continuing to rotate the cylindrical body. Also provided in accordance with the present invention is an apparatus for spin casting which comprises means for holding and spinning an elongated cylindrical body, and estruder means for providing a continuous stream of an extrudable uncured material in a desired fashion along the inside of the cylindrical body. (Author)

PB82-243726 PC **A03**/MF **A01**
Mannesmannroehren-Werke A.G., Duesseldorf (Germany, F.R.).
Automation of a 5 M Rolling Mill for Thermomechanical Rolling of Heavy Plate,
F. Agte, G. Fuser, K-U. Jansen, P. Schiefer, and K. Stallmannc. 1982, 45p KFK-PDV-168
Trans. of mono. Automatisierung einer 5-M-Grobblechstrasse fuer das Kontrollierte Endwalzen, Karlsruhe, p1-42 Aug 79. See also N82-15252.

The rolling processes applied for the manufacture of heavy plate, the so-called normal rolling and thermomechanical rolling, are illustrated. The thermomechanical rolling method is dealt with in consideration of the strategy used in the combination of rolling and cooling rates. Scope of duties and aims of automation as well as setup and mode of operation of the process control system are described. In addition, the project flow is discussed; some of the problems encountered while putting the installation into operation are mentioned.

PB82-248550 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.
An Algorithm for the Computer Control of Production in a Flexible Manufacturing System,
Joseph G. Kimemia, and Stanley B. Gershwin. Jan 82, 32p LIDS-P-1134-REV, NSF/MEA-82004
Grants NSF-DAR78-17826, NSF-MEA78-17826

A hierarchical algorithm for the control of production in automated, flexible manufacturing systems (FMS's) with unreliable machines is proposed. The algorithm is designed to fit into existing factory management structures. The top level of the hierarchy is responsible for regulating the input flow rate into the system so that production goals are met. The bottom level of the hierarchy interacts directly with the software that drives the FMS. Its objective is to ensure that the flow rates set by the levels above it are maintained. The hierarchical approach is compared to approaches suggested by other authors. An example and simulation results show that it is possible to accurately track demand requirements while maintaining a low inprocess inventory.

PB82-254459 PC **E06**/MF **E06**
National Materials Handling Centre, Cranfield (England).
Have Automated Storage and Retrieval Systems a Future in the United Kingdom.
Final rept.,
K. Firth, R. W. Lee, R. C. White, A. St.Johnson, and M. P. W. Lawrence. 1979, 110p
Proceedings of a One-Day Conference, June 1979, London (England).

Papers presented at this conference examined major aspects of automated storage and retrieval of goods, particularly in high-bay warehouses. Problems associated with such systems were considered. The situation in the United Kingdom and worldwide was reviewed, particularly in Japan, for which specific warehouses were described. Types of equipment were described in general, as well as machinery produced by specific manufacturers. The advantages of automation in terms of increased efficiency were discussed. The suitability of automated systems for small items was examined. The applicability of computers for use in automated warehouses was reviewed, and the requirements of computer hardware and software outlined.

PB82-872912 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Electrochemical Methods For Machining and Metal finishing. 1973-August, 1982 (Citations from Information Services in Mechanical Engineering Data Base).
Rept. for 1973-Aug 82.
Aug 82, 163p
Supersedes PB81-881385.Prepared in cooperation with Cambridge Scientific Abstracts, Washington, DC.

This bibliography contains citations concerning electrochemical machining methods. Topics include metal finishing, deburring, grinding, and machining of carbide tools. The choice of electrolytes and flow distribution is also presented. (This updated bibliography contains 244 citations, 15 of which are new entries to the previous edition.)

PB82-872920 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Annealing and Lubricants For The Cold Rolling of Steels. 1973-August, 1982 (Citations from Information Services in Mechanical Engineering Data Base).
Rept. for 1973-Aug 82.
Aug 82, 173p
Supersedes PB81-880593.Prepared in cooperation with Cambridge Scientific Abstracts, Washington, DC.

This bibliography contains citations concerning the cold rolling of steels and associated heat treatment procedures. The use of lubricants and the surface properties of the finished product are emphasized. The effects of heat treatment on material deformation and stress relief, and the utilization of automatic control equipment are also presented. (This updated bibliography contains 229 citations, 37 of which are new entries to the previous edition.)

PB82-873316 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Plastics and Elastomers: Plating Methods. 1973-August, 1982 (Citations from the Rubber and Plastics Research Association Data Base).
Rept. for 1973-Aug 82.
Aug 82, 129p
Supersedes PB81-880882.

This bibliography contains citations concerning the technology of the various plating methods of filled and unfilled thermoplastics and thermosets. Among the plating techniques discussed, electroplating and sputter coating of plastics and elastomers are emphasized. The plating of such materials as ABS, nylon, polypropylene, reinforced plastics, polystyrene, PVC, and elastomers is examined. (This updated bibliography contains 152 citations, 32 of which are new entries to the previous edition.)

PB82-873522 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Slip Casting of Refractory Materials. 1966-August, 1982 (Citations from the Metals Abstracts Data Base).
Rept. for 1966-Aug 82.
Aug 82, 58p
Supersedes PB81-881138.

This bibliography contains citations concerning the slip casting of refractory materials. The use of slurries of carbides, silicides, borides, and aluminum coatings are presented. The mechanical properties of the coatings are also discussed. (This updated bibliography contains 82 citations, 19 of which are new entries to the previous edition.)

13I. Machinery and Tools

DE82010059 PC **A02**/MF **A01**
Oak Ridge Y-12 Plant, TN.
Upgrading the Capabilities of Existing Machine Tools for Precision Machining.
W. E. Barkman. May 82, 8p Y/DX-349, CONF-820514-1
Contract W-7405-ENG-26
10. North American manufacturing research conference, Ontario, Canada, 24 May 1982.

A number of two-axis turning machines at the Oak Ridge Y-12 Plant have undergone upgrading as a means of meeting the needs for parts with tolerances that were more restrictive than the capability of the basic machine. The level of upgrading has ranged from changing a single machine characteristic to doing a complete overhaul of the slides, drives, spindle, and control system. The features available for the up-grading process include: tool setters, air bearing spindles and slides, pressurized oil bearing slides, electric dc torque motor drives, linear motor slide drives, eddy current spindle drives, laser feedback, vibration-isolation machine platforms, and computer numerical control (CNC) systems. Actual case histories are presented which show the levels of performance achieved with the various modifications. A discussion of the advantages and disadvantages of the various options is included. (ERA citation 07:044368)

13J. Marine Engineering

AD-A117 536/3 PC **A03**/MF **A01**
Norske Veritas, Oslo.
Cause Relationships of Collisions and Groundings - Research Project Conclusions,
K. Harald Drager, Jan E. Karlsen, Svein Kristiansen, and P. Morten. Oct 80, 29p Rept no. 80-P031
Presented at Symposium on Vessel Traffic Services, 28-30 Apr 81, Bremen.

IMCO's 1979 casualty statistics, analysing serious casualties to ocean-going tankers (1968-1979), conclude, inter alia, that the number and incidence rate of serious casualties for 1979, was the highest since the system was initiated in 1968. This is alerting, but perhaps not suprising. Because, when comparing with the airline industry, the lack of a safety philosophy in shipping is notable, and there should be no reason why the demands on safety concerning air traffic should not be required for traffic at sea.

AD-A117 740/1 PC **A11**/MF **A01**
David W. Taylor Naval Ship Research and Development Center, Bethesda, MD.
Measurement of the Pressure Distribution on Two Model Propellers.
Final rept.,
Stuart D. Jessup. Jul 82, 242p Rept no. DTNSRDC-82/035

Experiments are described in which the pressure distribution on two model controllable-pitch propellers was measured. The pressure was measured at 40 locations on the blade surface with the propeller operating in both uniform and inclined flow. The discussion of the experimental technique includes a description of the hardware and data analysis systems. The accuracy of the measured pressures was comparable to the measured calibration accuracy, excluding unexpected loading effects observed on some of the gages. The measured mean pressure distributions produced fair correlation with predictions based on equivalent two-dimensional blade-section methods at the design advance coefficient. The measured pressure coefficients at certain blade locations were observed to be dependent upon Reynolds number for a given advance coefficient. Boundary-layer separation is thought to have caused the Reynolds-number effect. These viscous effects were greater than previously anticipated.

AD-A117 628/4 PC **A09**/MF **A01**
Naval Postgraduate School, Monterey, CA.
An Interactive Computer Program for the Preliminary Design and Analysis of Marine Reduction Gears.
Master's thesis,
Joseph Louis Paquette. Mar 82, 188p

The objective of this project was to develop an interactive computer program providing flexibility in the design and analysis of marine propulsion gears. The program, Reduction Gear Analysis and Design (REGAD), will handle conventinal parallel axis and simple epicyclic reduction gears. It is capable of generating preliminary designs of new gear sets or of providing analyses of existing or proposed gear sets. Program development, organization, and operation are discussed.

AD-A117 829/2 PC **A04**/MF **A01**
Naval Postgraduate School, Monterey, CA.
A Damage Assessment Model for Surface Engagement for Missile and Gunfire.
Master's thesis,
Mario Ivan Carratu Molina. Mar 82, 59p

This thesis provides a model and computer program for rapid Damage Assessment. It may be used in any War Game between fleets of surface combatants. The effectiveness of conventional weapons in a naval environment depends upon the destructive power of the munitions, the rate of fire at which the munitions can be delivered on the target(s), the range to the target(s), and the reliability of the weapons systems in use.

AD-A117 885/4 PC **A04**/MF **A01**
Freeman (W.C.) and Associates, Tiverton, RI.
Installation of the MPM System on USS JESSE L. BROWN.
Final task rept.
14 Jul 82, 61p
Contract N00014-80-C-0188

Since this report covers the activities comprising the task of Contract No. N00014-80-C-0188, Contractor's conclusions and recommendations contained herein are preliminary and are subject to review and possible revision after David W. Taylor Naval Ship R & D Center (NSRDC) has completed the evaluation program which extends beyond the date of this report.

AD-A117 937/3 PC **A04**/MF **A01**
ARINC Research Corp., Annapolis, MD.
Development of Maintenance-Critical Systems and Equipments Lists for FFG-1 and FF-1040 Class Ships.
Research pub.,
J. Matakovich, and C. Beyers. May 82, 69p Rept no. 2640-10-1-2702
Contract N00140-80-D-1059

This document presents lists, in SWAB order, of the maintenance-critical systems and equipments installed on FFG-1 and FF-1040 Class ships. (Author)

PATENT-4 319 372 Not available NTIS
Department of the Navy, Washington, DC.
Submarine Rescue Cable Reel.
Patent,
Wayne R. Tausig. Filed 7 Apr 80, patented 16 Mar 82, 12p AD-D009 526/5, PAT-APPL-6-137 681
Supersedes PAT-APPL-6-137 681, AD-D007 167.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The patent describes apparatus for delivering a heavy cable such as a rescue cable from the ocean's surface to an extended for attachment to an object such as a stranded submarine and, after attachment of the free end of the cable to the object delivering the cable to the ocean's surface. A syntactic foam float provides positive buoyancy for a frame assembly which supports a cable reel holding the heavy cable. Releasable ballasts are included to provide an initial overall buoyancy of a small negative value during the descent of the apparatus. A release system is provided to simultaneously release the releasable ballast to change the buoyancy of the apparatus to a positive value, release the cable reel to allow cable payout. The cable reel is coupled to a waterbrake system which limits the rate of cable payout to below the rate of ascent of the rescue cable reel. The waterbrake system includes a depth-activated clutch which engages a secondary waterbrake to slow the rate of cable payout near the ocean surface. (Author)

PB82-251794 PC **E01**/MF **E01**
National Maritime Inst., Feltham (England).
Time-Averaged Aerodynamic Forces and Moments on a Model of a Three-Legged Concrete Production Platform,
C. F. Cowdrey. c1982, 25p NMI/R-35, OT-R-7808

Wind-tunnel measurements were made of the time-average aerodynamic forces and moments on an above-water model of a three-legged 'Condeep' platform similar to the Mobil Beryl A. The results of the measurements are presented in this report in the form of dimensional factors that allow full-scale values to be easily derived. Sufficient information on the basic model geometry is provided to enable overall wind forces and moments to be calculated for comparison with measured values.

PB82-251802 PC **E03**/MF **E03**
National Maritime Inst., Feltham (England).
Wind Effects on Offshore Platforms - A Summary of Wind Tunnel Studies,
M. E. Davies, and B. L. Miller. c1982, 62p NMI/R-140, OT-R-8215

The report summarizes the results of studies conducted for the Department of Energy, on the effects of wind on the environment of the topsides of offshore platforms. The effects of wind on the siting of helidecks, gas turbine and heating and ventilating inlet and exhaust ducts are reviewed and some general remarks included on flares, the working environment and the response of flexible substructures to wind.

PB82-251844 PC **E03**/MF **E03**
National Maritime Inst., Feltham (England).
Wind-Tunnel Measurements of Aerodynamic Forces and Moments on a Model of a Semi-Submersible Offshore Drilling Rig,
P. J. Ponsford. c1982, 59p NMI/R-34, OT-R-7807

The model was based on a SEDCO 700 series semi-submersible offshore drilling rig used for operations in the North Sea. This report supplements earlier work on wind-heeling moments which are required to establish stability criteria on semi-submersibles. Wind-loading data are also important when determining the power

requirements for station keeping. The tests formed part of a program of measurements of wind forces and moments on a number of models of offshore structures.

PB82-252669 PC **A02**/MF **A01**
Technische Hogeschool, Delft (Netherlands). Onderafdeling der Wiskunde en Informatica.
Shallow Water Ship Hydrodynamics,
A. J. Hermans. 1982, 20p 82-06

Equations for the shallow-water ship problem where a free surface plays an important role are derived. The steady flow around a slender ship is considered. The angle of attack of the undisturbed flow is small. This situation occurs quite often near shallow water harbor entrances or a ship maneuvering at shallow water where the variations in the course of the ship are with such a time scale that the flow may be considered to be stationary for each time interval. A coordinate system fixed to the ship, the positive x-axis is directed in the direction of the projection of the undisturbed incoming flow and the incoming flow makes an angle alpha with the x-axis is considered.

13K. Pumps, Filters, Pipes, Fittings, Tubing and Valves

AD-A117 418/4 PC **A02**/MF **A01**
Admiralty Marine Technology Establishment, Teddington (England).
Computation of Acoustic Power, Vibration Response and Acoustic Pressures of Fluid-Filled Pipes.
Technical memo.,
J. H. James. May 82, 20p AMTE(N)/TM-82036, DRIC-BR-83735

The time-harmonic excitation is either an interior point source of sound or a mechanical point force located on the pipe's surface. The acoustic power radiated into the exterior fluid, the vibration response of the pipe's wall, and the pressures in the exterior and interior fluids are computed by a simple integration scheme. Numerical results are presented for the case of a water-filled steel pipe that is surrounded by air.

DE82011490 PC **A04**/MF **A01**
TRW Energy Engineering Div., McLean, VA.
Pressure-Control Systems: An Approach and Design with Applications for METC Valve Testing.
D. R. Goff, G. E. Fasching, T. W. Keech, and P. S. Moritz. Nov 81, 59p DOE/MC/16050-1117
Contract AM21-81MC16050
Portions of this report are illegible.
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A system to control the pressure of a volume over a wide pressure range (atmospheric to 1600 psig) with an accuracy of +-15 psi, a stability of +- 0.05 psi up to 100 scfm, and a settling time of less than 2 minutes was developed at the Morgantown Energy Technology Center (METC) for use in the Lockhopper Valve-Testing and Development Project. The pressure-control system, used in four METC test units, was designed using a computer simulation. The simulation uses time-stepped models of the physical elements of the pressure-control loop such as VOLUME, VALVE, ACTUATOR, etc. The model developed was verified by testing the physical system after construction. The system uses one inlet valve and two vent valves controlled by a split signal from a single, three-mode, analog controller. The pressure-control-loop design and the simulation model are described in this report. (ERA citation 07:049011)

DE82903304 PC **A09**/MF **A01**
Borg-Warner Corp., Carson, CA. Byron Jackson Pump Div.
Feed-Pump Hydraulic Performance and Design Improvement, Phase I: Research Program Design. Final Report.
W. H. Brown, S. Gopalakrishnan, R. Fehlau, W. E. Thompson, and D. G. Wilson. Mar 82, 196p EPRI-CS-2323-V.2
Portions of document are illegible.

As a result of prior EPRI-sponsored studies, it was concluded that a research program should be designed and implemented to provide an improved basis for the design, procurement, testing, and operation of large feed pumps with increased reliability and stability over the full range of operating conditions. This two-volume report contains a research plan which is based on a review of the present state of the art and which defines the necessary R and D program and estimates the benefits and costs of the program. The recommended research program consists of 30 interrelated tasks. It is designed to perform the needed research; to verify the results; to develop improved components; and to publish computer-aided design methods, pump specification guidelines, and a troubleshooting manual. Most of the technology proposed in the research plan is applicable to nuclear power plants as well as to fossil-fired plants. This volume contains appendixes on pump design, cavitation damage, performance testing, hydraulics, two-phase flow in pumps, flow stability, and rotor dynamics. (ERA citation 07:043248)

13L. Safety Engineering

AD-A117 535/5 PC **A03**/MF **A01**
Norske Veritas, Oslo.
Cause Relationships of Collisions and Groundings Project Results and Conclusions,
K. Harald Drager. Oct 80, 36p Rept no. 80-P030
Presented at the Safety of Life at Sea Symposium, 20-21 Oct 80, Oslo.

The project was initiated in 1977 with the objective of recommending measures to reduce the number of casualties. The project tasks have been model and method development, analysis of about 3000 collisions and groundings, development of a manoeuvring simulator, near-miss analysis and evaluation of the idea of a data recorder for ships. The project has large support in the maritime society and a budget of 5.1 mill. NOK for the 4 year period ending this year. The recommended measures will vary for different ship sizes, and cover the areas of navigational aids, bridge systems, ship technology, personnel/competence and bridge procedures. Other important results are a casualty data system, a manoeuvring simulator concepts on accident investigation and basis for educational material. Some general observations on international work for safety at sea will be mentioned. (Author)

PB82-250671 PC **A04**/MF **A01**
Planning Research Associates, Inc., Baton Rouge, LA.
The Human Factor in High Fire Risk Urban Residential Areas: A Pilot Study in New Orleans, Louisiana.
Final rept.
Feb 76, 64p
Grant NFPCA-76055

This Project had as its major objective the determination of socio-economic, socio-cultural and socio-democratic variables related to fire occurence in a high fire risk urban residential area. The idea was to go beyond the mere reporting of types and kinds of fire and to delve into the human factor which accounted for fires.

PB82-250689 PC **A05**/MF **A01**
Planning Research Associates, Inc., Baton Rouge, LA.
Fire Prevention Program Planning in a Social Action Perspective: An Exploratory Study of Knowledge, Attitudes, and Leaders in a High Fire Risk Area of New Orleans, Louisiana.
Final rept.,
William J. Long. May 77, 80p
Grant NFPCA-76055

The authors of recent studies on urban fire problems stress the human factor in residential fires. They note that in high fire risk areas certain attitudes, values, aspirations, beliefs, and social interaction patterns must be considered in planning fire education programs. This theme in keeping with the National-Fire Prevention and Control Act which was designed to implement programs aimed at overcoming the apathy, indifference, and ignorance which accounts for many of the fires occuring in the nation. The importance of implementing such programs was stressed at the Second National Fire Prevention and Control Conference held in October 1976.

PB82-254020 PC **A07**/MF **A01**
Urban Inst., Washington, DC.
Fire-Code Inspections and Fire Prevention: What Methods Lead to Success.
Final rept.,
John R. Hall, Jr., Michael J. Karter, Jr., Margo Koss, Alfred H. Schainblatt, and Thomas C. McNerney.
Dec 78, 143p
Grant NSF-APR76-19148
Prepared in cooperation with National Fire Protection Association, Boston, MA. Sponsored in part by Fire Administration, Washington, DC.

The study was undertaken to determine whether some fire code inspection practices result in fewer fires, and lower fire loss, and fewer civilian casualties in properties covered by fire codes than do other fire-code inspection practices.

PB82-254244 PC **A09**/MF **A01**
Centaur Associates, Inc., Washington, DC.
Fire Suppression Crew Size Study, Phase II Methodology.
Final rept.
30 Jun 82, 185p
Contract EMW-C-0021

The aim of the proposed study is to measure the effects of differences in fire suppression crew size and first response complement size on fire suppression effectiveness and firefighter and civilian casualties, given differences in tactics, equipment and other controllable suppression practices, and given differences in fire size and other uncontrollable characteristics of the fire situation. The study should also identify how additional firefighters affect suppression operations and their results. Three sources of data are used: real fire ground, fire training ground simulations, and a combined task analysis/computer simulation procedure. The approach addresses the relationship between factors representing fire ground effectiveness and alternative numbers of firefighters assigned to a fire rather than crew size per se. With this information, communities should be able to make more informed choices about the price they are willing to pay for fire protection and the corresponding amount of risk they are willing to bear.

PB82-916903 PC **A07**/MF **A01**
National Transportation Safety Board, Washington, DC. Bureau of Accident Investigation.
Railroad Accident Reports - Brief Format, Issue Number 2, 1980.
23 Feb 82, 145p NTSB-RAB-82-1
Paper copy also available on subscription, North American Continent price $130.00/year; all others write for quote.

The publication contains briefs of selected railroad accidents occurring in U.S. Railroad operations during calendar year 1980. The brief format presents basic facts, conditions, circumstances, and probable cause(s) in each instance. Additional statistical information is tabulated by types of accidents and casualties related to types of accidents, carriers involved, and causal factors.

PB82-917000 Subscription
National Transportation Safety Board, Washington, DC. Bureau of Technology.
Special Investigation Reports.
Irregular repts.
1982, open series
Paper copy available on subscription, North American Continent price $90.00/year; all others write for quote. Single copies also available in paper or microfiche.

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PB82-917002 PC **A03**/MF **A01**
National Transportation Safety Board, Washington, DC. Bureau of Technology.
Special Investigation Report - Accidents Involving Passengers between Coupled Cars on the New York City Transit Authority.
26 Apr 82, 27p NTSB-SIR-82-1
Paper copy also available on subscription, North American Continent price $90.00/year; all others write for quote.

Approximately 7:52 p.m. on Thursday, May 5, 1977, on the NYCTA Division A, No. 1 Line subway train near

Franklin Street station in Manhattan, New York, a 22-year-old male passenger fell between the second and third cars of a five-car rail rapid transit train and was fatally injured. As the train braked for the stop at the station, witnesses observed thevictim passing between the cars, and it appeared to the witnesses that the victim fell through the chains to the roadbed. During a 5-year period from 1977 through 1981, 25 of the 48 passenger fatalities reported by all rapid rail transit systems were between-car fatalities (about 52 percent). During 1981, nine between-car passenger fatalities were reported; eight of the nine fatal accidents occurred on the New York City Transit Authority (NYCTA). The National Transportation Safety Board is concerned that the incidence of between-car passenger fatalities has continued since its recommendations in 1977. The purpose of this report, therefore, is to analyze this problem primarily as it relates to the NYCTA system and to identify areas in which corrective action may be warranted.

13M. Structural Engineering

AD-A117 925/8 PC **A05**/MF **A01**
New Mexico Engineering Research Inst., Albuquerque.
Reinforced Concrete Modeling.
Final rept.,
H. L. Schreyer, and J. W. Jeter, Jr. Jul 82, 88p
NMERI-TA-8-9, AFWL-TR-82-9
Contract F29601-81-C-0013

Significant aspects of plain concrete behavior under large dynamic loading were identified and used to evaluate current concrete models. Since the endochronic and viscoplastic models provide satisfactory descriptions of many significant features of concrete behavior, they were chosen for detailed study. Both models compared well with existing experimental data. To illustrate that both models were operational and that numerical analyses could be performed, a preliminary finite element analysis was performed for a beam column with a monotonically increasing lateral displacement as a loading function. This fundamental work establishes the foundation for a development effort that addresses the problems of steel-concrete interaction, rate effects, and the analysis of reinforced concrete structures. (Author)

AD-A117 944/9 PC **A04**/MF **A01**
Oklahoma Univ., Norman. School of Aerospace, Mechanical and Nuclear Engineering.
Analyses of Beams Constructed of Nonlinear Materials Having Different Behavior in Tension and Compression.
Technical rept.,
C. W. Bert, and F. Gordaninejad. Jul 82, 74p Rept nos. OU-AMNE-82-5, TR-30
Contract N00014-78-C-0647

This report consists of two parts. In part 1, a transfer-matrix analysis is presented for determining the static behavior of thick beams of 'multimodular materials' (i.e., materials which have different elastic behavior in tension and compression, with nonlinear stress-strain curves approximated as piece-wise linear, with four or more segments). To validate the transfer-matrix method results, a closed-form solution is also presented for cases in which the neutral-surface location is constant along the beam axis. (Author)

DE82009466 MF **A01**
Southern Solar Energy Center, Atlanta, GA.
Houston, Texas Design/Build House. Case Study Report.
J. O. Borden, and C. B. Porter. Jun 81, 65p SSEC/SP-41227
Contract AC02-79CS30166
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

The task activities relating to the Houston house, including problems, constructive comments, and successes, are described. Included in appendices are: cost data, methodology for ranking cities, house information sheet, thermal performance analysis, architectural information release, press releases and news clippings, and house pictures. One appendix was abstracted separately. (ERA citation 07:043010)

DE82009498 PC **A03**/MF **A01**
Southern Solar Energy Center, Atlanta, GA.
Passive-Design Concepts Applied to Multifamily Construction, Chesapeake, Virginia. Final Report.
1981, 48p SSEC/TP-41286
Contract AC02-79CS30166

The design and technical assistance process for multifamily development in the Norfolk/Virginia Beach, Virginia areas is documented. The energy-related alternatives considered and the process of evaluating them, site planning, building design, and thermal performance analyses are included. The project was conducted in cooperation with the local building community to achieve effective technology transfer. (ERA citation 07:043015)

DE82009501 MF **A01**
Southern Solar Energy Center, Atlanta, GA.
Houston Design/Build Workshop for Passive Solar Homes: Summary.
Oct 81, 36p SSEC/SP-41290
Contract AC02-79CS30166
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

The workshop is briefly described and evaluated. Evaluation forms completed by 20 of the 50 attendees are given as well as the analysis of the data they provide. Conclusions are drawn regarding the program, speakers, site, communication materials, and professional identification of the attendees (as architects, builders, etc.). (ERA citation 07:049877)

DE82009563 MF **A01**
Southern Solar Energy Center, Atlanta, GA.
Performance Study of a Thermal-Envelope House. Phase I. Final Report.
J. M. Akridge, and C. C. Benton. 1981, 70p SSEC/TP-41144
Contract AC02-79CS30166
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

The thermal envelope house was shown to perform quite well whether the weather was cold and cloudy, mild and clear, or cold and clear. Due to the timing of the contract initiation, the instrumentation was not in position during the coldest, low-insolation months of December and January, but it was in operation in late February when temperatures dropped to below 10 exp 0 F at night and remained below 45 exp 0 F during the day. Temperatures within the house could be kept above 68 exp 0 F on the worst days with a minimum use of the wood stove. The instrumentation showed that there was thermally induced circulation around the thermal envelope, but this flow rate was lower than was expected, never exceeding .5 ft/second and frequently below the noise level of our relatively sensitive hot wire anemometer. On a sunny day, air was warmed in the greenhouse and rose to induce air circulation in the loop. However, due to the low air flow rates and energy loss through the attic and north wall, the air reaching the crawlspace had little energy available for storage. Surface and subsurface temperature measurements showed the earth in the crawlspace to remain well below adequate storage temperatures, remaining below 60 exp 0 F at all times. Temperature measurements within the living space showed the temperatures to be remarkably uniform throughout the house. The uninsulated, double concrete-block west wall was found to be a significant source of energy loss. An exterior scan of the house using an IGA Thermovision infrared camera showed the exterior of the west wall to be significantly higher in temperature than the north wall. The tests also showed that internal loads (people, lights, appliances, etc.,) were a significant factor in maintaining interior temperature levels, a characteristic of all well-insulated houses. (ERA citation 07:043029)

DE82010401 PC **A02**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Assessment of Low Emittance/High Thermal Impedance Windows for Solar and Conventional Applications.
J. K. E. Ortega. Jan 82, 8p SERI/TP-254-1405, CONF-820410-2
Contract AC02-77CH00178
ASME solar energy conference, Albuquerque, NM, USA, 26 Apr 1982, Portions of this report are illegible. Microfiche only after original copies are exhausted.

The thermal impedances R for single and multi-pane window systems are determined as a function of the surface emissivity of the window panes, the number of low-emissive surfaces, the location of low-emissive surfaces, and the spacing between window panes. Also, the effect of reduced free convection and gas conduction between window panes is determined. The results demonstrate that only a small increase in thermal impedance is associated with the addition of each pane of ordinary glass, an increase of R approx. = 0.2 (W/m exp 2 exp 0 C) exp -1 . On the other hand, a significant increase in thermal impedance can be obtained with the use of low-emissive surface coating applied to the window pane. For example, a double-pane window with a single low-emissive surface between panes can provide a thermal impedance of 0.6 less than or equal to R less than or equal to 1.0 (W/m exp 2 exp 0 C) exp -1 . A triple-pane window with two low-emissive surfaces, one between each pair of surfaces, can provide a thermal impedance of 1.4 less than or equal to R less than or equal to 1.8 (W/m exp 2 exp 0 C) exp -1 . Further improvements can be obtained by reducing or eliminating the convective heat transfer between panes with low-emissive surfaces by providing a partial or total vacuum between window panes. (ERA citation 07:047214)

DE82012913 MF **A01**
Princeton Univ., NJ. Center for Environmental Studies.
Retrofit-Twin Rivers Housing. Annual Report, October 1, 1980-September 30, 1981.
D. T. Harrje. 1981, 14p DOE/CS/20062-1
Contract AS02-77CS20062
Portions of document are illegible.
Available in microfiche only.

Progress is reported on the following research programs: retrofit case studies in representative houses; air infiltration studies to include natural infiltration versus pressurization, ventilating effects of pressure fluctuations, and local wind vs weather station readings; advanced concept to include retrofitting concurrent monitoring, performance indices and monitoring, storage of coolth for air conditioning and thermal systems; and side effects of conservation measures to include field research, and registry and research assessment. (ERA citation 07:043960)

DE82013250 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Earth-Sheltered Housing: An Evaluation of Energy-Conservation Potential.
R. L. Wendt. Apr 82, 49p ORNL/CON-86
Contract W-7405-ENG-26

The Innovative Structures Program (ISP) began an evaluation of the energy conservation potential of earth-sheltered houses in late 1979. Since that time, several projects have been undertaken as part of this evaluation. The findings of these projects, plus a discussion of the work of others in the field, form the body of this report. Although a comprehensive evaluation of earth-sheltered housing has not been completed, this report presents a compendium of knowledge on the subject. The conclusions are more qualitative than quantitative in nature because of the limited information on which to base projections. The major conclusions to date are as follows: Earth-sheltered houses are capable of very good energy performance. Earth-sheltered houses, as a passive means to conserve energy, perform significantly better in some climatic regins than in others. Earth-sheltered houses are not the optimum passive concept in several major housing growth regions of the country. Earth-sheltered houses, including their land and site improvements, will cost an estimated 10 to 35% more than comparable above-ground houses, and this additional cost may not be justified on a life cycle cost basis, given 1981 market conditions. The use of earth sheltering will probably grow in some parts of the country; however, broad-scale national or regional utilization is not likely to occur in the next 20 to 30 years. (ERA citation 07:043996)

PB82-250176 PC **A12**/MF **A01**
Bolt Beranek and Newman, Inc., Cambridge, MA.
A Survey of Enforcement Practice with Respect to Noise Control Requirements in Building Codes in a Number of European Countries,
Theodore J. Schultz. Nov 76, 270p EPA/550/9-77/400
Portions of this document are not fully legible.

The report introduces the problem of effective enforcement of noise control requirements in building

codes throughout Europe, examines in detail two approaches of special interest and finally proposes a new approach to the endorsement of building code noise requirements.

PB82-250366 PC **E03**/MF **E02**
Cement and Concrete Association, Slough (England).
The Analysis of Beams in Plane Frames According to CP110,
A. W. Beeby. c1978, 38p ISBN-0-7210-1133-0, DEVELOPMENT-1

This report describes a study of the analysis of plane frames subjected to vertical loading with particular reference to the analysis provisions of CP 110. The report can be considered to fall into three main sections. The first considers the objectives of analysis, the level of accuracy required in the analysis of building structures and the level of accuracy which may be attainable. The second section considers the various simplifications of a frame which are permitted by the Code and attempts to assess where these will be significant in design. The final section considers redistribution; how it should be carried out and how much should be done.

PB82-252230 PC **E03**/MF **E03**
Cement and Concrete Association, Slough (England).
Heat Losses from an Unoccupied House.
Technical rept.,
D. C. Spooner. c1982, 26p TR-549, ISBN-0-7210-1256-6
Also pub. in ISSN-0528-3701.

The report describes the monitoring over a 15-month period of the heat supplied to and heat lost from an unoccupied house in the grounds of the Cement and Concrete Association. The house was sealed to prevent air infiltration and the windows were covered to eliminate heat transfer by radiation between inside and outside. It was found that heat losses through the house fabric are proportional to U-values and to the time-averaged temperature differential between the inside and outside environment. Comparison between heat input and measured heat loss shows that cold-bridges constitute a significant energy drain. Heat losses from the ground floor slab do not appear to conform with the current methods of estimation.

PB82-252339 PC **A04**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Development of an Ease of Ignition Test Using a Flame Exposure,
J. R. Lawson, and W. J. Parker. Jun 82, 67p NBSIR-82-2503
Sponsored in part by Naval Sea Systems Command, Washington, DC., and Gypsum Association, Evanston, IL.

A test for the ease of ignition of interior finish materials by flame exposure was developed. Two specimens, 140 mm (5.5 in) wide by 152 mm (6 in) high, face each other at a distance of 53 mm (2.1 in) apart. A methane diffusion flame passes between their surfaces and extends to about 152 mm (6 in) above them. The operator observes the specimen surface and records the time-to-flame attachment. A phototube, which views the exposure flame, shows a marked increase in output when the specimens start contributing fuel. The times-to-flame attachment were compared with the observed times of wall involvement in some full-scale tests. The ignition sensitivity is expressed by the time-to-flame attachment and by the time-to-fuel contribution. The times-to-flame attachment measured in the ignition apparatus generally ranked 22 materials with the observed times of wall involvement in full-scale tests. The results of this test may be useful as one factor in computer models of fire growth in enclosures.

PB82-252479 PC **A02**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
The Microstructure of Epoxy Bonded Steel-To-Concrete Joints.
Final rept.,
G. O. Loyd, and A. J. J. Calder. c1982, 24p TRRL/SR-705, TRRL-SUPPLEMENTARY-705
Also pub. in ISSN-0305-1315.

Exposure tests were carried out on concrete beams (508mm x 102mm) strengthened by a single mild steel plate bonded to the surface of the concrete using a structural grade epoxy adhesive containing a siliceous filler. Visual examination showed that corrosion of the steel plate can take place at the interface between the steel and the adhesive. The existence of chlorides in the corrosion product was also detected. Similar results were observed for a small section of plate removed from a strengthened highway bridge. A microstructural analysis of the concrete/resin system using marker solutions and electron microscopy revealed cracks and pores in the concrete and the resin. These cracks were shown to act as routes for corrosive liquids to reach the steel plate and cause corrosion. The use of a chromate primer on the steel plate was successful in inhibiting the corrosion without greatly affecting the structural strength.

PB82-253873 PC **E05**/MF **E05**
National Materials Handling Centre, Cranfield (England).
Fire Prevention in High-Bay Warehouses: Design and Management Techniques for Fire Prevention in High-Bay Warehouses.
Final rept.,
A. C. Parnell. 1981, 89p
Also pub. in ISSN-0-905823-08-7.

In order to establish factors restricting advances in the building of high-bay warehouses (warehouses in which unit loads are stored using mechanized placing) in Great Britain, an investigation was carried out to examine the fire risks in such warehouses and the means by which those risks could be minimized. Data concerning fires in high-bay warehouses worldwide were studied in order to quantify the occurrence of fires and the cost of damage sustained. Types of high-bay warehouses were identified and the associated fire risks examined. Fire-protection systems, such as sprinklers, and fire-fighting equipment were investigated and insurers' requirements considered.

PB82-254293 PC **A03**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Epoxy Coated Reinforcement in Bridge Decks.
Interim rept.,
J. Wills. c1982, 30p TRRL/SR-667, TRRL-SUPPLEMENTARY-667
Also pub. in ISSN-0305-1315.

A review was conducted of methods relating to the use of epoxy-coated reinforcing bars for bridge decks and their potential for use in the United Kingdom. A survey of work carried out in the USA was carried out and the analysis used in a preliminary cost study. The options of having either a hot rolled asphalt surfacing or a permanently exposed concrete wearing surface were considered. It was concluded that epoxy coating of the top steel in addition to current waterproofing practice would provide - at relatively little extra cost - additional assurance that the reinforcement would be adquately protected throughout the life of a bridge. Current design rules do not permit decks with permanently exposed concrete wearing surface without waterproofing. Epoxy coating may afford a means of introducing such decks but before a positive recommendation to delete waterproofing can be made further studies would have to be undertaken.

PB82-873209 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Foundation Piles: Design, Emplacement, and Behavior. 1973-August, 1982 (Citations from the BHRA Fluid Engineering Data Base).
Rept. for 1973-Aug 82.
Aug 82, 128p
Supersedes PB81-872657.

This bibliography contains citations concerning piles and pileworks design, emplacement or sinking, and behavior in various soils, environments, locations, and applications. Piles, pile driving techniques and equipment, and high and low pile structures are considered. Dynamic response of piles and pileworks to various conditions such as wind, wave, ice, seismicity, soil instability and long term displacement is also examined. (This updated bibliography contains 134 citations, 47 of which are new entries to the previous edition.)

PB82-873258 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Silos: Structural Analysis. 1970-August, 1982 (Citations from the Engineering Index Data Base).
Rept. for 1970-Aug 82.
Aug 82, 110p
Supersedes PB81-881682.

This bibliography contains citations concerning the silo stress-strain relationship to silo structural analysis, material being stored, feeding and discharge operation, and settlement performance. Among the factors discussed relative to structural analysis are foundation material and design, wall joint strength, thin wall design, reinforced concrete wall design, ferrocement construction, steel wall construction, foundation settlement and tension hoop utilization. Such materials as grain; sugar; coal; corn; fertilizer and powdered substances, like cement; are considered for their dilatancy upon unloading relative to the stress-strain analysis. (This updated bibliography contains 115 citations, 27 of which are new entries to the previous edition.)

14.

METHODS AND EQUIPMENT

14B. Laboratories, Test Facilities, and Test Equipment

AD-A117 441/6 PC **A06**/MF **A01**
Michigan State Univ., East Lansing. Dept. of Electrical Engineering and Systems Science.
Adaptive Sampling for Enhanced Performance of an Ion Detection System for a Triple Quadrupole Mass Spectrometer.
Interim technical rept.,
R. S. Matthews, C. G. Enke, and P. D. Fisher. 15 Jul 82, 117p Rept no. TR-8
Contract N00014-76-C-1092

Detection and tabulation of mass-selected ions are the primary means of data acquisition for mass spectrometers. Previous detection systems have been limited in dynamic range, or in data throughput, so that inefficient and limited use of the ion information resulted. Analysis of the statistical properties of randomly arriving ions and the use of state-of-the-art technologies have led to the development of an enhanced ion detection system (IDS) for a triple quadrupole mass spectrometer (TQMS). An adaptive sampling technique maximizes data throughput without distorting relative error or limiting dynamic range. This microprocessor-based system measures flux rates from 10 to the zero power to 10 to the 9th power ions per second up to a maximum relative error of 1%; sampling periods are reduced to their statistically defined minimums. Preliminary tests have validated the correctness of the IDS design along with its capability for on-line customized operation through the use of powerful and flexible high-level software. (Author)

AD-A117 518/1 PC **A04**/MF **A01**
Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
Windtunnel Capability Related to Test Sections, Cryogenics, and Computer-Windtunnel Integration.
Advisory rept.,
R. O. Dietz. Apr 82, 67p Rept no. AGARD-AR-174

Experiments in windtunnels have been the major basis for improved understanding of fluid dynamics through research and for enhanced aerospace vehicle efficiency through development since before the first powered flights. The area rule concept, the supercritical airfoil, and engine installation configurations that provide favorable interference which are presently being applied to military aircraft and fuel efficient transport aircraft were evolved through windtunnel experiments. Present windtunnel experiments on active control systems and more complete integration of the propulsion system into the aerodynamics of flight vehicles will

yield the improvements in effectiveness for the next generation of aircraft. Confidence that windtunnels are expected to continue to contribute to such advances is evidenced by the construction of the new large subsonic tunnel capabilities in Europe and in America, the construction of the cryogenic National Transonic Facility in America, and the planning for the European Transonic Windtunnel. (Author)

AD-A117 569/4 PC **A02**/MF **A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
China's Newly Designed and Built Aircraft Engine Test Stand.
29 Jun 82, 9p Rept no. FTD-ID(RS)T-1448-81
Edited trans. of Guoji Hangkong (China) n4 p19-21 Apr 80, by Randy Dorsey.

No abstract available.

AD-A117 572/8 PC **A03**/MF **A01**
Naval Surface Weapons Center, Silver Spring, MD.
Numerical Solution of an Ill-Posed Problem Arising in Wind Tunnel Heat Transfer Data Reduction,
John B. Bell, and Andrew B. Wardlaw, Jr. 4 Dec 81, 37p NSWC/TR-82-32, SBI-AD-F500 046

This report documents a computer program which solves an improperly posed heat conduction problem arising in the measurement of heat transfer data in wind tunnel experiments. The mathematical model which is treated is one dimensional and assumes constant material properties. The computational approach is based on an adaptation of a method used by Alifanov to treat a similar problem. The Green's function for a well posed heat conduction problem is used to reduce the problem to a Volterra integral equation of the first kind. Tikhonov regularization techniques are then applied to compute stable approximate solutions. Numerical results for several cases typical of a class of wind tunnel experiments are presented.

AD-A117 631/2 PC **A02**/MF **A01**
Rutgers - The State Univ., New Brunswick, NJ. Dept. of Mechanics and Materials Science.
Nondestructive Method for Determining Fatigue and Stress-Corrosion Damage.
Final rept.,
I. R. Kramer, and S. Weissmann. Jul 82, 22p
DTNSRDC-82/051
Contract N00600-77-C-1134

The distribution of dislocations in the surface layer and the interior of fatigued and stress-corrosion damaged specimen was determined by X-ray line broadening techniques. The data indicate that in both cases the dislocation density in the region of the surface is higher than that in the interior initially. With increasing damage the dislocation density in the interior increases rapidly and finally becomes equal to that of the surface. A crack or fracture occurs when this condition is fulfilled. The ratio of the dislocation density in the surface and the interior can provide a measure of the damage caused by fatigue and stress corrosion. Measurements of fatigue and stress-corrosion damage by the X-ray technique agreed closely with the measured damage. (Author)

AD-A117 669/2 PC **A03**/MF **A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS. Structures Lab.
Investigation of the Rapid Analysis Machine (RAM) for Determining the Cement Content of Fresh Concrete.
Final rept. 1979-1981,
Joe G. Tom. Apr 82, 41p Rept no. WES/TR/SL-82-4

The Rapid Analysis Machine (RAM) is a semiautomatic means of determining the cement content of freshly mixed concrete. Developed in England, the RAM incorporates the concepts of particle behavior as a function of size and mass in its determination of cement content. Five minutes after an 8-kg sample of concrete has been introduced in the RAM, the cement content can be determined from a set of calibration curves. A series of typical concrete field mixtures was used to evaluate the RAM. These mixtures had cement contents ranging from 300 to 1000 lb/cu yd; several contained fly ash at a 30 percent replacement rate by volume, and one contained an admixture which entrained a total air content of 6 percent. The actual RAM unit evaluated could detect and determine the cement content to within + or - 12.3 percent of the original cement content. It was found that air-entrained concrete must be treated differently before testing to ensure that the results have been affected by the entrained air bubbles. (Author)

AD-A117 674/2 PC **A04**/MF **A01**
Systems Research Labs., Inc., Dayton, OH. Research Applications Div.
Finite-Element Analysis of Some Full- and Partial-Ring Crack-Propagation Test Specimens.
Final rept. Jun 79-May 81,
Noel E. Ashbaugh, and Jalees Ahmad. Mar 82, 63p
AFWAL-TR-82-4015
Contract F33615-79-C-5025

Ring-shaped specimens containing cracks are analyzed by a finite-element method. Results are obtained for the stress-intensity factor and the deformation or compliance of the specimen at locations which are convenient for experimental measurement. The specimens which are analyzed are the full-ring geometries under tensile and compressive loads having a single or double crack emanating from the inner radius, with the crack plane perpendicular to the load line for tensile loads and coinciding with the load line for compressive loads. A modified C-specimen and half rings under tensile loads having a single crack are analyzed. Results are obtained for various crack lengths and aspect ratios (inner radius divided by outer radius) equal to 0.5, 0.333, and 0.25. The results for the modified C-specimen are determined only for an aspect ratio of 0.5. Functional expressions are given for the stress-intensity factor and the compliance for the single-crack ring tension specimen and the modified C-specimen. (Author)

AD-A117 720/3 PC **A02**/MF **A01**
Aeronautical Research Labs., Melbourne (Australia).
A Spectrum Analyser for Acoustic Emission.
Technical memo.,
I. G. Scott. Jun 82, 17p Rept no. ARL-MAT-TM-382

Frequency analysis of acoustic emission (AE) involves the capture and analysis, or real-time analysis, of an impulsive or non-repetitive signal. The present ARL procedure involves the use of a transient recorder and conventional heterodyne spectrum analyser, and no more than one event per five seconds can be handled. Even with the adoption of a strict sampling procedure, much information is lost, particularly during the important periods of intensive AE activity. Upton (1977) discussed the use of the heterodyne analyser, of parallel analogue or digital filters, and of the FFT algorithm. Commercial equipment based on these principles is available but expensive. Clark and Mathieson (1977), and Graham (1979), used matched sets of band-pass filters whose centre frequencies were related by a fixed ratio. This method of spectral analysis is fast, provides an output suitable for handling by a computer and, by restricting the number of bands, suppresses much unwanted detail in the spectrum. It was chosen for laboratory development and was constructed from available cheap components. (Author)

AD-A117 803/7 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Experimental Evaluation of Interferometric Alignment Techniques for Multiple Mask Registration.
Journal article,
Theodore M. Lyszczarz, Nicholas P. Economou, Dale C. Flanders, and Peter D. DeGraff. 29 May 81, 6p
MS-5658, ESD-TR-82-029
Contract F19628-80-C-0002, ARPA Order-600
Pub. in Jnl. of Vacuum Science and Technology, v19 n4 p1214-1218 Nov/Dec 81.

No abstract available.

AD-A117 841/7 PC **A09**/MF **A01**
Systems Research Labs., Inc., Dayton, OH. NDE Systems Div.
Advanced Nondestructive Evaluation (Ultrasonic Pulser/Receiver Technology).
Final rept. 29 May 79-1 Feb 81,
Robert A. Shaufl. May 82, 182p AFWAL-TR-81-4038
Contract F33615-79-C-5020

The overall goal of this program was to develop a digital ultrasonic correlation system for NDE application of greater versatility and capability than the successful analog system developed in-house at AFWAL/MLLP. SRL had only limited success in meeting this overall goal. The program broke into two complementary tasks: (1) development of an all-digital Pulser/Receiver with a bandwidth of 85 MHz and a maximum gain of 80 dB; and (2) development of a pseudo-random correlation unit. The Pulser/Receiver met all of its necessary requirements; however, the correlation unit suffered from a technical design decision made early in the program as to the number of 'bits' used in the correlation process. The decision (based upon both cost and the results of the computer model of an 8-bit correlation system) was to utilize 1-bit correlation. This choice led to an unavoidable (and most undesirable) nonlinearity in the correlated signal output when the input signal/noise ratio approached unity. This unfortunate consequences has restricted the versatility and capability of the entire system.

AD-A117 882/1 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Compact Multiple-Channel SAW Sliding-Window Spectrum Analyzer.
Journal article,
Duane R. Arsenault, and Victor S. Dolat. 1981, 7p
MS-5755, ESD-TR-82-033
Contract F19628-80-C-0002
Pub. in Ultrasonics Symposium, p220-225 1981.

No abstract available.

AD-A117 903/5 PC **A03**/MF **A01**
Air Force Wright Aeronautical Labs., Wright-Patterson AFB, OH.
KQ Measurements with Rheometrics Mechanical Spectrometer.
Final rept. Mar-Dec 81,
C. Y-C. Lee, and W. B. Jones, Jr. May 82, 48p Rept no. AFWAL-TR-82-4014

A testing method to measure the fracture toughness properties KQ, which is related to a specific sample geometry and dimensions (half-inch compact tension), has been established using the Rheometrics Mechanical Spectrometer (RMS) as the loading instrument. This particular sample size was chosen so that the testing could be incorporated as part of a 50 gram evaluation scheme which was designed to provide systematic, preliminary properties information of new resins. The RMS was chosen for the experiment because of its unique temperature capabilities. Neat specimens of Narmco-5208 Epoxy have been fracture tested at temperatures between -150 degrees C to 250 degrees C and interesting fracture behavior was observed. The fracture surfaces relating to these fractures were studied using Scanning Electron Microscope. (Author)

DE82009809 PC **A03**/MF **A01**
General Electric Co., Schenectady, NY. Energy Systems Programs Dept.
Long-Term Materials-Test Program: Quarterly Report, October-December 1981.
Jan 81, 40p DOE/ET/15457-1112
Contract AC21-79ET15457
Microfiche only after original copies are exhausted.

The Long Term Materials Test has completed 250 hours of Corrosion Validation Testing. Metallographic analysis of the materials specimens is underway, but preliminary examination indicates that the corrosion is severe relative to that experienced at Exxon and CURL. The possible causes are being assessed before continuing the test. Two operating problems were encountered during the validation testing. Hard deposits formed on the cascade pressure surface and plugged the passage when the combustor was operated at 1800 exp 0 F. Dropping combustor temperature to 1750 exp 0 F alleviated the problem. The in-bed heat exchanger also experienced severe erosion. The erosion problem has been solved and the test completed. (ERA citation 07:044445)

DE82010747 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Reliability Strategies in Flaw Evaluation.
S. H. Bush. Aug 80, 18p PNL-SA-8817, CONF-8010190-2
Contract AC06-76RL01830
Symposium on NDE, Pittsburgh, PA, USA, 5 Oct 1980, Portions of document are illegible.

Critical inputs into any fracture mechanics model are the shape, size, orientation and location of flaws in the system being analyzed. All of these parameters will have finite error values when determined by non-destructive examination (NDE) techniques such as ultrasonics (UT). The factors influencing ultrasonic detection, sizing and location of defects are examined to permit a prediction of reliability values for the various

parameters. The linear elastic fracture mechanics model used in Appendix A of ASME Section XI of the Boiler and Pressure Vessel Code is examined in the context of flaws in various locations in a pressure boundary to infer the necessary levels of reliability in detecting, locating and sizing these flaws by UT. Where the NDE reliability values were considered to be inadequate with conventional UT, based on analysis of fracture mechanics parameters, potential gains with alternate or advanced NDE systems were examined. (ERA citation 07:047714)

DE82011190 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Experimental Device for Measuring the Momentum of Disperse Granular Materials.
H. E. Watling, and S. K. Griffiths. 10 Feb 82, 7p
UCRL-87243, CONF-820516-3
Contract W-7405-ENG-48
Joint conference on experimental mechanics, Honolulu, HI, USA, 22 May 1982, Portions of document are illegible.

An experimental device for measuring the time averaged momentum associated with a steady stream of a disperse granular material has been developed. The mathematical basis for the device is presented including a discussion of using the momentum measurement to compute the local mass or energy fluxes. The analysis considers both nonuniform particle mass and nonuniform velocities for the various constituents of an aggregate material. The results of calibration experiments conducted with a prototype transducer are shown with theoretical predictions of these results.

DE82012778 MF **A01**
Sandia National Labs., Albuquerque, NM.
Validation Diagnostics for Defective Thermocouple Circuits.
R. P. Reed. 1982, 9p SAND-82-1518C, CONF-820306-9
Contract AC04-76DP00789
Symposium on temperature, Washington, DC, USA, 14 Mar 1982, Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

Thermocouples, properly used under favorable conditions, can measure temperature with an accepted tolerance. However, when improperly applied or exposed to hostile mechanical, chemical, thermal, or radiation environments, they often fail without the error being evident in the temperature record. Conversely, features that appear to be unreasonable in temperature records can be authentic. When hidden failure occurs during measurement, deliberate recording of supplementary information is necessary tof distinguish valid from faulty data. Loop resistance change, circuit isolation, isolated noise potential, and other measures can reveal symptoms of developing defects. Monitored continually along with temperature, they can reveal the occurrence, location, and natures of damage incurred during measurement. Special multiterminal branched thermocouple circuits and combinatorial multiplex switching allow detection o dc measurement noise and decalibration. Symptoms of insidious failure, often consequential, are illustrated by examples from field experience in measuring temperature of a propagating retorting front in underground coal gasification. (ERA citation 07:047940)

DE82012811 PC **A05**/MF **A01**
Lawrence Livermore National Lab., CA.
Research to Define Algorithms Appropriate to a High-Data-Rate Laser-Wavelength-Measurement Instrument.
R. L. Byer. 1 Apr 82, 79p UCRL-15451
Contract W-7405-ENG-48
Portions of document are illegible.

Progress made over a four year period on a computer controlled laser wavelength meter is summarized. The optical system of the laser wavelength meter consists of a series of Fabry-Perot interferometers and one high resolution confocal interferometer, preceeded by a one-half meter grating spectrometer. The interferometrically generated fringes are imaged on linear diode arrays, read into computer memory and processed by an efficient, noise resistant, algorithm which calculates the wavelength. The algorithm fitting routine generates high accuracy fringe fits at a rate of 5Hz with the present LSI 11/2 processor. A 10 Hz fitting rate is expected with the LSI 11/23 processor. Fringes are fit with an rms error of less than +- 0.01. The wavelength measurement accuracy is thus one hundredth of the free spectral range of the interferometers, which at present are 10 cm exp -1 , 1 cm exp -1 , 0.1 cm exp -1 and 0.01 cm exp -1 . Thus wavelengths can be measured to +- .0001 cm exp -1 or +- 3 MHz. The wavelength meter interferometers are calibrated by a stabilized HeNe laser source with a long term stability of better than +- 1 MHz. Fringes have been fit for over 10 exp 6 cycles to demonstrate the stability of the algorithm. When the hardware is transferred from the present bread-borad mounting to final mounting, the wavelength meter will provide an accurate and versatile approach for measuring and displaying cw, pulsed, single mode or multi mode laser spectra. (ERA citation 07:044588)

DE82701479 MF **A01**
CEA Centre d'Etudes de Bruyeres-le-Chatel, Montrouge (France).
Automation of Densitometric Study of Photographic Plates for Spark Mass Spectrometry Analysis of Impurities in Solid Samples.
G. Naudin. May 81, 16p CEA-CONF-5773, CONF-8105152-1
In French.Association of mass spectrometry of solids conference, Antwarp, Belgium, 18 May 1981.
U.S. Sales Only. Available in microfiche only.

Automation of a microdensitometer was developed for a reliable examination of photographic plates obtained in spark mass spectrometry for analysis of traces of impurities in solid materials. This automation is time saving in respect to manual examination and gives a great accuracy of the response curve of photographic emulsion. The on-line software allows a great flexibility. (Atomindex citation 13:660981)

N82-27329/3 PC **A05**/MF **A01**
TRW Defense and Space Systems Group, Redondo Beach, CA.
The Phoretic Motion Experiment (PME) Definition Phase.
Final Report.
L. R. Eaton, and S. L. Neste. 14 May 82, 100p
NASA-CR-162038, NAS 1.26:162038
Contract NAS8-34319

The aerosol generator and the charge flow devices (CFD) chamber which were designed for zero-gravity operation was analyzed. Characteristics of the CFD chamber and aerosol generator which would be useful for cloud physics experimentation in a one-g as well as a zero-g environment are documented. The Collision type of aerosol generator is addressed. Relationships among the various input and output parameters are derived and subsequently used to determine the requirements on the controls of the input parameters to assure a given error budget of an output parameter. The CFD chamber operation in a zero-g environment is assessed utilizing a computer simulation program. Low nuclei critical supersaturation and high experiment accuracies are emphasized which lead to droplet growth times extending into hundreds of seconds. The analysis was extended to assess the performance constraints of the CFD chamber in a one-g environment operating in the horizontal mode.

N82-27719/5 PC **A08**/MF **A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Development of a Diode Laser Heterodyne Spectrometer and Observations of Silicon Monoxide in Sunspots.
Ph.D. Thesis.
D. A. Glenar. Nov 81, 171p NASA-TM-83902, NAS 1.15:83902

A state of the art, tunable diode laser infrared heterodyne spectrometer was designed and constructed for ground based observations throughout the 8 to 12 micron atmospheric window. The instrument was optimized for use with presently available tunable diode lasers, and was designed as a flexible field system for use with large reflecting telescopes. The instrument was aligned and calibrated using laboratory and astronomical sources. Observations of SiO fundamental (v = 1-0) and hot band (v = 2-1) absorption features were made in sunspots near 8 microns using the spectrometer. The data permit an unambiguous determination of the temperature pressure relation in the upper layers of the umbral atmosphere, and support the sunspot model suggested by Stellmacher and Wiehr.

PAT-APPL-6-325 885 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Pasadena, CA. Pasadena Office.
Instrumentation for Sensing Moisture Content of Material Using a Transient Thermal Pulse.
Patent Application,
L. C. Yang. Filed 30 Nov 81, 17p N82-25484/8, NASA-CASE-NPO-15494-1
Contract NAS7-100
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Instrumentation is developed for sensing moisture content of material using a transient thermal pulse and is comprised of a sensing probe having a sensing element in the form of a ribbon excited by a constant current pulse to increase the temperature, and therefore the resistance, of the ribbon linearly. Moisture in web material limits the increase of temperature during the pulse in proportion to the moisture content. This increase in temperature produces a proportional increase in resistivity which is measured with a Wheatsone bridge as a change in voltage displayed by a measurement display unit. The probe is glued in a shallow groove of a lucite bar and connected to copper pins embedded in the bar.

PAT-APPL-6-378 161 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Two Layer Hydraulic Analogy Method for Testing Supersonic Gas Flows with Shock Waves.
Patent Application,
Franklin D. Hains. Filed 14 May 82, 21p AD-D009 574/5
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The patent application describes a method of studying steady and unsteady supersonic gas flow using a two layer hydraulic analogy technique. The method simulates the specific heat ratio of the gas. Two layers of immiscible liquids having different densities and thickness are held in a shallow container. The densities and thickness are held in a shallow container. The densities are chosen and the layer thickness are adjusted to simulate the specific heat ratio of the gas. A model of a device to be studied is submerged in the liquid. Relative flow is caused to occur between the model and liquid. Relative flow is caused to occur between the model and liquid simulating steady flow. The depth of the lower layer during the period of relative flow is measured and is anlogous to steady state gas flow characteristics. For studying unsteady flow two bodies of liquids each having two layers of liquids of densities chosen, and lower layer thicknesses adjusted to simulate the specific heat ratio of the gas system, are held in a container separated by a removeable gate. Flow is caused to occur from the high to low pressure liquid body simulating unsteady flow. The depth of the lower layers during the period of flow is analogous to unsteady gas flow characteristics. (Author)

PATENT-4 323 842 Not available NTIS
Department of the Army, Washington, DC.
Method and Apparatus for Electrically Testing Radiation Susceptibility of MOS Gate Devices.
Patent,
James M. McGarrity, and Harold E. Boesch, Jr. Filed 19 Feb 80, patented 6 Apr 82, 6p AD-D009 538/0, PAT-APPL-6-122 208
Supersedes PAT-APPL-6-122 208, AD-D007 524.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A method and apparatus are disclosed for testing susceptibility of a gate insulator in MOS and MIS devices to irradiation without use of ionizing radiation. The method consists of simulating the effects of radiation by applying a high magnitude, pulsed electric field to the device under test. An apparatus capable of determining the relationship between voltage applied to the device under test and the device capacitance is used to provide the desired susceptibility information. (Author)

PATENT-4 325 246 Not available NTIS
Department of the Navy, Washington, DC.
Compass Checker.
Patent,
Gordon R. Cooke. Filed 29 May 81, patented 20 Apr 82, 7p AD-D009 547/1, PAT-APPL-6-268 601
Supersedes PAT-APPL-6-268 601, AD-D008 835.

Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A device is disclosed for generating a rotatable magnetic field for calibrating a compass. The field generated overcomes the earth's magnetic field and any other nearby magnetic field. A U-shaped housing has a first calibrated dial on the top horizontal member and a dial on the bottom horizontal member. The dials are mechanically linked to rotate in unison. Each dial contains a pair of bar magnets. The compass to be tested in positioned within the interior of the U-shaped housing. An adjustment knob is provided for turning the top and bottom dials and thereby permitting orientation of the four magnets within a range of 360 deg. The accuracy of the compass can thereby be tested. (Author)

PB82-252354 PC **A02**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Design Considerations for the Cross-Bridge Sheet Resistor,
G. P. Carver, R. L. Mattis, and M. G. Buehler. Jul 82, 23p NBSIR-82-2548

The cross-bridge sheet resistor test structure is used to obtain the sheet resistance and electrical linewidth of a conducting layer. It has been used to characterize various conducting layers found in an integrated circuit fabrication process and to evaluate lithographic equipment used for processing photomasks and wafers. Three geometrical design factors for the cross bridge have been investigated and are shown to cause systematic inaccuracies of less than one percent in the sheet resistance and linewidth measurements. Based upon experimental results from sequences of devices with incrementally different geometrical parameters, several design criteria for the cross-bridge sheet resistor have been established.

PB82-253139 PC **A04**/MF **A01**
Queen Mary Coll., London (England).
A Laser-Interferometer Method for Determining the Forces on a Freely-Flying Model in a Shock-Tunnel.
Final rept.,
L. Bernstein, and G. t. Stott. Aug 81, 57p QMC/EP-1041, UL/QMC/EP-1041

An interferometric method was developed for following the trajectory of a weakly-restrained model in a shock tunnel where force levels were of the order of 10 N for flow durations of about 1 ms. The system contained two simple Michelson interferometers, with two measurement and two reference beams from a simple He-Ne laser. The measurement beams were reflected from the model and recombined with the reference beam at a photodetector. The cycle dark-light-dark at the detector corresponded to a model displacement of about 0.3 micrometers along the measurement beam. The resultant frequency-modulated wave trains were recorded by two transient recorders.

PB82-873274 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Accelerometers. 1970-August, 1982 (Citations from the NTIS Data Base).
Rept. for 1970-Aug 82.
Aug 82, 266p
Supersedes PB81-851495.

This bibliography contains citations concerning research, design, construction and applications of accelerometers for measurement of motion, vibration, medicine, roughness, waves, shear stress, shock, and gravity. (This updated bibliography contains 265 citations, 65 of which are new entries to the previous edition.)

PB82-873860 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Nondestructive Testing of Fractures. 1972-August, 1982 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1972-Aug 82.
Aug 82, 234p
Supersedes PB82-854159.Prepared in cooperation with the National Aeronautics and Space Administration, Washington, DC.

This bibliography contains citations concerning the nondestructive techniques for testing or examining fractures in miscellaneous materials and in a wide variety of fabricated structures and equipment. Theoretical consideration of fracturing processes are presented. (This updated bibliography contains 232 citations, 29 of which are new entries to the previous edition.)

14D. Reliability

AD-A117 865/6 PC **A02**/MF **A01**
State Univ. of New York at Binghamton. Dept. of Mathematical Sciences.
Bayes Adaptive Estimation of the Point of Shift to the Wear-Out Phase of Reliability Systems.
Technical rept.,
S. Zacks. 2 Aug 82, 20p Rept no. TR-1
Contract N00014-81-K-0407

A new family of life distributions, called the wear-out distributions, is developed on the basis of a failure rate function, which is a constant up to the change-point and strictly increasing afterwards. Properties of these wear-out distributions are derived and a Bayes adaptive procedure is developed for the estimation of the change point. Recursive formulae are given for the determination of the posterior probability that the change has occurred and of its Bayes estimator. The results of numerical simulations are given to illustrate the properties of the adaptive procedure. (Author)

14E. Reprography

AD-A117 801/1 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
High Resolution Ion Beam Lithography.
Journal article,
Nicholas P. Economou, Joseph P. Donnelly, and Dale C. Flanders. 12 Jun 81, 5p MS-5661, ESD-TR-82-030
Contract F19628-80-C-0002
Pub. in Jnl. of Vacuum Science and Technology, v19 n4 p1172-1175 Nov/Dec 81.

No abstract available.

N82-28167/6 PC **A05**/MF **A01**
Philips Forschungslaboratorium G.m.b.H., Hamburg (Germany, F.R.).
Magneto-Optic Pattern Generators for Electrophotographic Printers.
Final Report.
B. Hill, and K. P. Schmidt. Jan 82, 93p BMFT-FB-T-82-014, ISSN-0340-7608
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

The magneto-optic light switching technique and its feasibility for electronic reproduction of text or graphics by electrophotography were studied. An optical line-pattern generator to be used as electro-optic input device was constructed. Based on magneto-optic switching arrays, the best matching of spectral features, light output power other essential parameters with the electrophotographic process was investigated. The results of recording experiments with an optimized design of light source, imaging optics and light switching array used to expose organic photoconductors in a special electrophotographic test apparatus show the feasibility of the technique at medium recording speed.

PAT-APPL-6-375 623 PC **A02**/MF **A01**
Department of the Air Force, Washington, DC.
Evaluation of Photographic Sensor Overall Performance.
Patent Application,
Gilbert G. Kuperman, and Thomas Stanzione. Filed 6 May 82, 21p AD-D009 570/3
Portions of this document are not fully legible.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An object of the invention is to provide devices and procedures to produce a multidimensional evaluation of imaging sensor systems. According to the invention, a series of unidimensional measures (geometric, spatial frequency, sharpness, limiting resolution, and operator performance) are obtained and a global describing function is developed, and using multiple regression techniques, to represent system performance. The embodiment described is based on analyzing the capabilities of a photographic reconnaissance camera but can be generalized to apply to any imaging sensor. The invention provides a unique combination of image quality assessment equipment and techniques, together with a means of combining their individual estimates into a single, general describing function. The resultant representation is of immediate utility to system operators, system developers, image interpreters, and image analysts. (Author)

PATENT-4 323 641 Not available NTIS
Department of the Navy, Washington, DC.
Photographic Image Enhancement by a Gold-Toning Neutron-Activation Process.
Patent,
Clarence D. Bond. Filed 15 Apr 80, patented 6 Apr 82, 4p AD-D009 555/4, PAT-APPL-6-178 330
Supersedes PAT-APPL-6-178 330, AD-D007 565.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This document describes a gold-toning neutron-activation process for intensifying or amplifying the contrast in extremely weak images in photographic negatives where the exposure level may be as low as 1.5% of optimum. The method involves three main steps: gold toning of the silver image on the negative; neutron activation of the gold image to produce radioisotopes; and transfering the image to an unexposed autoradiographic film as the ionizing radiation from the radioactive gold exposes the film to produce intensification of the contrast.

PB82-873621 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Photopolymeric Printing. 1972-August, 1982 (Citations from the Institute of Paper Chemistry Data Base).
Rept. for 1972-Aug 82.
Aug 82, 129p
Supersedes PB81-880411.

This bibliography contains citations concerning the advantages and disadvantages of using photopolymers for flexographic, letterpress, rotary press and offset lithographic printing plates. Technological innovations in photopolymerization of printing ink systems for application on newsprint, corrugated board, cardboard, printing labels and food packaging are discussed. Polymeric binders, tradenames, manufacturers, and domestic and foreign patents are included. (This updated bibliography contains 109 citations, 18 of which are new entries to the previous edition.)

15.

MILITARY SCIENCES

15B. Chemical, Biological, and Radiological Warfare

AD-A117 949/8 PC **A07**/MF **A01**
Army Nuclear and Chemical Agency, Springfield, VA.
US Army Chemical Effects Data Requirements (CEDAR) 1982.
1982, 128p Rept no. MONA-WE-1-82

This Chemical Effects Data Requirements (CEDAR) document is the first edition of the formal statement of Army requirements for chemical effects information. It contains the statement of, and justification for, each Army requirement for chemical effects information, to

include proposed application of the information, and assigned priority based on tactical, doctrinal, operational, and material and equipment needs of the Army as indicated by the Army Chemical Action Plan (ACAP), Joint Development Objective Guide (JDOG), and other appropriate Army documents. The CEDAR document is intended to facilitate the dialogue between the user and developer of the required information and forms the basis for a program to obtain the answers to the chemical effects questions which impact on every facet of chemical warfare. As an approved Department of the Army document, it is the major basis and authority for the 6.1-6.2 funded research to satisfy Service requirements in the area of chemical effects. (Author)

15C. Defense

AD-A117 431/7 PC **A02**/MF **A01**
Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
Expert's Use of Information: Is It Biased.
Conference paper,
Ruth H. Phelps. 18 Jun 82, 13p
Paper from the Proceedings of the Army Sciences Conference (1982), 15-18 Jun 82.

Two experiments were conducted to compare the use of base rate and sample size information by experts and novices in making predictions about future events. Results showed that even though the majority of experts used both types of information, they used very simplistic information processing strategies. All participants regardless of expertise used highly systematic although individualistic strategies in making their predictions. These results and methodology can be used to assess and improve Army personnel information processing through training and automated systems development.

AD-A117 690/8 PC **A03**/MF **A01**
National Defense Univ., Washington, DC. Research Directorate.
Facing Uncertainties About Combat Service Support,
Moorad Mooradian. 1982, 39p Rept no. NATL SEC AFFAIRS ISSUE PAPER-82-2

Since 1975 the Army has suffered major reductions in its authorizations for active duty combat service support (CSS) manpower. Today, concerned observers are asking: to what extent have these reductions in CSS compromised Army combat power, and what can be done to correct the deficiency. The purpose of this paper is to suggest a methodology for measuring CSS functions in relation to combat power to better illustrate the weighted importance of CSS. One suggested tool to help in defining CSS objectives and in evaluating CSS effectiveness and costs is the Force Reliability Model at Appendix A. Hypothetical data are used to illustrate the methodology, but the formulas are applicable to factual data.

15D. Intelligence

PB82-873464 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Psychological Warfare. 1970-August, 1982 (Citations from the NTIS Data Base).
Rept. for 1970-Aug 82.
Aug 82, 171p
Supersedes PB82-854571.

This bibliography contains citations concerning studies, debriefing reports, analyses, and military lessons learned from various aspects of psychological warfare. Some consideration is given to psychological warfare training and scenarios in military and civilian contexts. (This updated bibliography contains 156 citations, 51 of which are new entries to the previous edition.)

15E. Logistics

AD-A117 588/4 PC **A05**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Improving the Electronic Repair Capabilities in the Fleet.
Master's thesis,
Nancy E. Brown. Mar 82, 83p

Maintenance in the U.S. Navy is officially prescribed to be accomplished by a three-tiered approach: organizational level (ship's force), intermediate level (tenders and shore-based intermediate maintenance activities--SIMAs), and depot level (shipyards). This thesis examines current trends in the utilization of these levels for maintenance of electronic equipment. The major objective was to determine the impact on manpower, training and supply support that an increase in the organizational level's responsibilities would have. An extensive research effort considered all available printed material relating to the maintenance systems currently in use. Interviews with maintenance managers at all levels of command were conducted at U.S. Navy maintenance facilities at Pearl Harbor, Hawaii, San Diego, California, and Norfolk, Virginia. These interviews addressed general maintenance topics as well as specifics on eight pieces of electronic equipment. The major conclusion of this effort is that given adequate training, proper tools and increased supply support the organizational level's capabilities are constrained only by the physical limitations of its vessel. (Author)

AD-A117 686/6 PC **A05**/MF **A01**
Construction Engineering Research Lab. (Army), Champaign, IL.
Development and Analysis of Energy Consumption Norms for Family Housing.
Final rept.,
L. M. Windingland, and D. J. Leverenz. Apr 82, 76p Rept no. CERL-TR-E-175

Congress has directed in PL 95-82 and PL 95-101 that ceilings be established for energy consumption in military housing, and that a method be developed for assessing actual energy consumption above the ceiling. This report describes and analyzes a procedure used to set energy consumption ceilings (norms) for military family housing during a 1-year test program. The report includes the methods used to group thermodynamically equivalent buildings. These building groups are used to provide statistical samples for analysis of the norm and the range, mean and standard deviation of actual consumption. The weather parameters used in the norm algorithm properly predict the trends in heating and cooling requirements of residential buildings. Variations between the calculated norm and actual consumption are illustrated, and explained. The report also shows how family living habits cause actual utility consumption to vary widely among housing units that are thermodynamically alike. This report concludes that an equitable energy use ceiling for military family housing can be established, but that the present norm concepts and algorithms need to be refined. (Author)

AD-A117 734/4 PC **A11**/MF **A01**
IIT Research Inst., Chicago, IL.
Least Cost Test Profile. Volume I.
Final technical rept. Aug 80-Aug 81,
Joseph J. Steinkirchner. Apr 82, 240p RADC-TR-82-84-VOL-1
Contract F30602-80-C-0263
See also Volume 2, AD-A117 735.

IIT Research Institute conducted a 12-month study to develop test profiles for rigid wall tactical shelters. A survey was conducted and operational data were obtained on over 1100 tactical equipment/systems. Test cost data and test results were obtained, and an effort to determine the correct text sequence was instituted. The operational data, test costs, test results and the output from the test sequence effort were used to develop test profiles for eight members of the standard family of shelters. (Author)

AD-A117 735/1 PC **A16**/MF **A01**
IIT Research Inst., Chicago, IL.
Least Cost Test Profile. Volume II.
Final technical rept. Aug 80-Aug 81,
Joseph J. Steinkirchner. Apr 82, 362p RADC-TR-82-84-VOL-2
Contract F30602-80-C-0263
See also Volume 1, AD-A117 734.

IIT Research Institute conducted a 12-month study to develop test profiles for rigid wall tactical shelters. A survey was conducted and operational data were obtained on over 1100 tactical equipment/systems. Test cost data and test results were obtained, and an effort to determine the correct text sequence was instituted. The operational data, test costs, test results and the output from the test sequence effort were used to develop test profiles for eight members of the standard family of shelters. (Author)

AD-A117 868/0 PC **A02**/MF **A01**
General Accounting Office, Washington, DC. Federal Personnel and Compensation Div.
Objectivity of the Defense Science Board's Task Force on Embedded Computer Resources Acquisition and Management.
22 Jul 82, 9p Rept no. GAO/FPCD-82-55
See also AD-A111 334.

DSB is made up of 33 members--28 at-large members, a Chair and Vice Chair from the civilian sector, and the three Chairmen of the Army, Navy, and Air Force scientific advisory groups. The civilian members are appointed by the Secretary of Defense on the basis of the Under Secretary of Defense for Research and Engineering's (USDRE's) recommendations and the members' preeminence in the fields of research and engineering. DSB conducts its work primarily through task forces. In August 1981, USDRE requested that the DSB Chair convene a task force on embedded computer resources acquisition and management. The task force included 11 members and an executive secretary. Four military observers provided the military perspectives to the task force and acted as a communications link between the services and the task force.

AD-A117 872/2 PC **A03**/MF **A01**
Cold Regions Research and Engineering Lab., Hanover, NH.
Moisture Detection in Roofs with Cellular Plastic Insulation -- West Point, New York, and Manchester, New Hampshire.
Special rept.,
Charles J. Korhonen, and Barry A. Coutermarsh. May 82, 27p Rept no. CRREL-SR-82-7

New roofs with cellular plastic insulation and a bituminous built-up membrane were surveyed with a handheld infrared camera to determine its effectiveness in detecting damp and wet insulation. Wet areas were found and defined with the help of 2-in.-diam. core samples. The results of the tests showed the infrared camera can be useful and effective as an inspection tool within the time constraints of the typical one-year warranty period. The tests also underlined the importance of core samples for verification. (Author)

15F. Nuclear Warfare

DE82008623 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Investigation of the Feasibility of a Helicopter-Launched Cruise Missile System.
C. W. Moses. Jan 82, 13p SAND-81-2415
Contract AC04-76DP00789
Portions of document are illegible.

This study was initiated to investigate the feasibility of launching cruise missiles from helicopters. In addition to determining the feasibility of a helicopter-launched cruise missile, a configuration was developed and a concept of operations was developed that consists of a flight of three CH-53E helicopters. Two of these helicopters carry eight cruise missiles each; the third carries a security force. This flight could be dispersed to the field and maintained in the field by use of the security force helicopter and alternate load-carrying helicopters required under present regulations governing movement of nuclear weapons. Operational constraints of security and weather were investigated, and the cost of acquiring and maintaining a helicopter-launched cruise missile force was estimated. (ERA citation 07:044613)

DE82012507 MF **A01**
Reynolds Electrical and Engineering Co., Inc., Mercury, NV.
Plumbbob on-Site RAD-Safety.
1981, 250p OTO-57-2
Contract AC08-76NV00410

Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

On-site radiological safety activities and monitoring results for each shot in Operation Plumbbob are described. (ERA citation 07:047968)

DE82012513 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Using Game Theory to Evaluate the Stability of Strategic Forces.
G. C. Reinhardt, and R. K. Squire. 1 Feb 82, 23p
UCID-19297
Contract W-7405-ENG-48

A game theory method for evaluating the stability of various strategic force deployments in a confrontation between two parties is described. To illustrate the method future US and Soviet ICBM forces are projected. Evaluation of the results indicates that the concept of deterrence can indeed be investigated in terms of a party's incentive or disincentive to initiate a nuclear exchange and that this measure can be quantitatively determined. We suggest that this allows us to structure strategic forces to preclude either side from calculating any advantage from initiating a nuclear exchange. (ERA citation 07:044617)

15G. Operations, Strategy, and Tactics

AD-A117 396/2 PC **A02**/MF **A01**
Construction Engineering Research Lab. (Army), Champaign, IL.
The Engineer Modeling Study.
Conference paper,
D. Gordon Bagby. 18 Jun 82, 15p
Paper from the Proceedings of the Army Sciences Conference (1982), 15-18 Jun 82.

The objective of the Engineer Modeling Study is to measure the contribution of combat engineers to the effectiveness of the combined arms team. The research program originated from a Mission Area Analysis (the Engineer Family of Systems Study (E-FOSS)), which noted that Army war games were good at representing unit offensive and defensive movements, but weak in modeling the impact of US and Soviet Union combat engineer activities on battle outcomes. In 1979, the US Army Engineer School (USAES), representing the Training and Doctrine Command (TRADOC), requested that US Army Construction Engineering Research Laboratory (CERL) to correct this deficiency. The Engineer Modeling Study was the result. The Engineer Modeling Study itself is part of the larger Army Model Improvement Program (AMIP) which seeks to improve the caliber and quality of Army war games. An implicit goal of the Engineer Modeling Study is accurate and consistent representation of the effectiveness of engineer effort throughout the AMIP model hierarchy.

AD-A117 560/3 PC **A04**/MF **A01**
Naval Postgraduate School, Monterey, CA.
SEATAG Extension.
Master's thesis,
Francis A. Devereux. Mar 82, 73p

The SEATAG EXTENSION will revise and suggest optional and alternative rules for the game SEATAG: A Sea Control Tactical Analysis Game. Alternative rules are proposed for damage assessment, detection, classification, targeting. weapon's effectiveness, and ASMD close in weapon systems. Air-to-air combat tables have been revised to include the latest additions to both the United States and Soviet naval aircraft inventories. Optional rules will incorporate electronic warfare, battle damage repairs, miniature ship model combat, and use of the Tomahawk cruise missile.

AD-A117 711/2 PC **A03**/MF **A01**
American Science and Engineering, Inc., Arlington, VA. Space Systems Div.
A Program to Study the Detection of Target Hits by Directed Energy Weapons.
Final rept. 1 Apr 81-31 Mar 82,
J. K. Silk. Mar 82, 47p ASE-4700, AFOSR-TR-82-0571
Contract F49620-81-C-0045

This is the final report on a study of the detection, using X-ray emission signatures, of target hits by netural particle beam directed energy weapons. We find that the energy deposition needed for a detectable signature is a small fraction of that required for lethality. This result causes optimism about the feasibility of X-ray hit detection. Two potential obstacles up to detection were considered: The naturally occurring background and absorption by the residual atmosphere. Spectral discrimination can solve the background problem. The emitted spectrum contains characteristic X-rays, especially K-lines. For metallic targets, the background is small at the characteristic wavelength. The background contribution can be suppressed by narrowing the bandpass. Absorption by the residual atmosphere is negligible above 200 km altitude. At lower altitudes, attentuation is unimportant for nickel or steel targets, but significant for materials with longer wavelength K-lines. The ranges of beam/detector parameter values over which detection is possible are presented. The next steps should be implementation studies. Large area detectors with spectral discrimination are needed. Collecting optics using synthetic multilayer structures are a promising approach. (Author)

AD-A117 793/0 PC **A09**/MF **A01**
Operational Research and Analysis Establishment, Ottawa (Ontario).
Strategic Studies Reading Guide. 1981 Supplement. Volume I. Conflict-Its Nature and Consequences, the Causes and Control of Conflict, Military Potential (Etudes Strategiques-Bibliographie, Supplement 1981. Volume I. Le Conflit-Sa Nature et ses Consequences, Causes et Controle des Conflits, Potentiel Militaire),
L. Motiuk. 1981, 187p
See also Volume 2, AD-A117 794.

Source material for the 1981 Supplement was obtained at the libraries or reading rooms of the following organizations: Institute for the Study of Conflict, International Institute for Strategic Studies, Royal Institute for International Affairs and, the Royal United Services Institute for Defence Studies, London, England, Canadian Forces College and the Canadian Institute of International Affairs, Toronto, Ontario, Department of External Affairs, Department of Justice, Department of National Defence, University of Ottawa, and Carleton University, Ottawa, Ontario. Assistance in the preparation of this Supplement was provided by J. Beaumont, B. Brooks, and D. Woods of the School of International Affairs, Carleton University. The contribution of the composition staff of the Directorate of Documentation and Drawing Services, Department of National Defence during the technical production phase is appreciated. The publication of the next volume in this series is planned for the spring of 1983. (Author)

AD-A117 794/8 PC **A20**/MF **A01**
Operational Research and Analysis Establishment, Ottawa (Ontario).
Strategic Studies Reading Guide. 1981 Supplement. Volume II. National Security Strategy Annexes (Etudes Strategiques-Bibliographie. Supplement 1981. Volume II. Securite Nationale Strategie Annexes),
L. Motiuk. 1981, 475p
See also Volume 1, AD-A117 793.

Source material for the 1981 Supplement was obtained at the libraries or reading rooms of the following organizations: Institute for the Study of Conflict, International Institute for Strategic Studies, Royal Institute for International Affairs and, the Royal United Services Institute for Defence Studies, London, England, Canadian Forces College and the Canadian Institute of International Affairs, Toronto, Ontario, Department of External Affairs, Department of Justice, Department of National Defence, University of Ottawa, and Carleton University, Ottawa, Ontario. Assistance in the preparation of this Supplement was provided by J. Beaumont, B. Brooks, and D. Woods of the School of International Affairs, Carleton University. The contribution of composition staff of the Directorate of Documentation and Drawing Services, Department of National Defence during the technical production phase is appreciated. The publication of the next volume in this series is planned for the spring of 1983. (Author)

PB82-873415 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Operations Research Applied To Military Systems. June, 1970-August, 1982 (Citations from the NTIS Data Base).
Rept. for Jun 70-Aug 82.
Aug 82, 157p
Supersedes PB82-854092.

This bibliography contains citations concerning the applications of operations research and systems analysis to military operations, systems, and logistics. (This updated bibliography contains 120 citations, 15 of which are new entries to the previous edition.)

16.
MISSILE TECHNOLOGY

16A. Missile Launching and Ground Support

AD-A117 692/4 PC **A03**/MF **A01**
Materials Research Labs., Ascot Vale (Australia).
Electromagnetic Launchers: Background and the MRL Program,
Yong-Chia Thio. Mar 82, 27p Rept no. MRL-R-848

An active R. & D. program is being undertaken into the technology of electromagnetic launchers. These have potential applications in weaponry, controlled thermonuclear fusion, space launch, advanced industrial processes, equation-of-state research, generation of intense magnetic fields and as facilities for a wide range of studies in penetration mechanics, detonation, and warheads. This paper draws attention to these matters and gives a description of the current Australian DSTO program in the development of this technology. (Author)

16D. Missiles

AD-A117 407/7 PC **A03**/MF **A01**
Army Missile Command, Redstone Arsenal, AL. Systems Simulation and Development Directorate.
Methods for Validating Computer Simulation Models of Missile Systems.
Technical rept.,
Latricha Greene, and Douglas Montgomery. Aug 81, 44p Rept no. DRSMI/RD-81-17

An overview of simulation model methodology is presented with emphasis on how these techniques may be applied in the missile simulation environment. Because most missile simulations produce time series output which must be matched to corresponding flight or laboratory test data, the primary focus is on time series methods. Univariate spectral analysis and cross spectral analysis techniques useful in simulation model validation are described. Examples are given using both artificially generated and real data. (Author)

17.
NAVIGATION,

COMMUNICATIONS, DETECTION, AND COUNTERMEASURES

17A. Acoustic Detection

AD-A117 531/4 PC **A02**/MF **A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Economics.
Bearing Estimation Using Random Arrays.
Technical rept.,
Melvin J. Hinich. Jul 82, 9p Rept no. TR-24
Contract N00014-75-C-9494

A sonobuoy field is a random two dimensional array if the signals from the sensors are coherently processed. The sensor position coordinates must be estimated to a fraction of a wavelength in order to coherently process the signals, which is a separate processing task since the field has a changing random pattern due to drifting of the buoys. This paper reviews the statistical properties of the maximum likelihood bearing estimator computed from coherent summation of output signals from randomly deployed sensors. It is shown that the approximate mean-square bearing error for a small random array favorably compares with that for a square array of equally spaced sensors with about one-half the aperture. The random array is not subject to the aliasing (grating lobes) problem of an equally spaced array, and a great deal of array gain can be achieved from a large array of randomly placed sensors. Serious consideration should be given to tracking the locations of drifting sonobuoys so as to coherently process them as an array.

AD-A117 632/0 PC **A03**/MF **A01**
Naval Underwater Systems Center, New London, CT. New London Lab.
Detection Threshold Calculations for Cross Correlation Processing.
Technical memo.,
Peter N. Mikhalevsky. 18 Mar 80, 27p Rept no. NUSC-TM-801040

Detection threshold calculations are performed for cross correlation processing of the received signals from two fixed omnidirectional sensors of a moving source generating an arbitrary random power spectrum. The effects of doppler decorrelation and volumetric absorption, and the degradation as a result of multiple bottom bounce and surface reflections are included. The equations for ROC curves are presented. A computer program which accepts as input the source power spectrum, noise power spectrum, averaging time, frequency analysis band, and sensor baseline separation solves for the detection threshold given a .5 probability of detection and .001 probability of false alarm. (Author)

AD-A117 748/4 PC **A04**/MF **A01**
University of Southern California, Los Angeles. Dept. of Electrical Engineering.
Highly Parallel Modern Signal Processing.
Annual progress rept. 1 Mar 81-28 Feb 82,
Sun-Yuan Kung. 28 Feb 82, 53p
Prepared in cooperation with California Univ., San Diego, Hughes Research Lab., Integrated Systems, Inc., and Stanford Univ., CA.

This report describes our research activities under SRO project, performed by University of Southern California, Naval Ocean System Center, Hughes Research Laboratories, Univ. of Calif., San Diego, Standford University and Integrated Systems, Inc., for the period 1 March 1981 to 28 February 1982 with the Office of Naval Research. This research activities have focussed on the VLSI signal processing theory and algorithms and the development of parallel computing architectures. A solution in today's VLSI research challenge lies in a cross-disciplinary research encompassing the areas of mathematics, algorithms, computers and applications. To this end, this report summarizes two parallel major research tasks: (1) Signal processing algorithm and theory - emphasizing spectral analysis and its applications; and (2) parallel computing structures - utilizing VLSI potential for high-speed signal processing.

PAT-APPL-6-307 923 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Linear Frequency Sweep Generator for Continuous Transmission FM Sonar.
Patent Application,
William J. Zehner. Filed 2 Oct 81, 8p AD-D009 559/6
Availability: This Government-owned invention availble for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention relates to continuous transmission frequency modulated (CTFM) echo ranging systems, and more particularly to sonic ranging systems which produce a continuous target indication. (Author)

17B. Communication

AD-A117 371/5 PC **A02**/MF **A01**
Florida Univ., Gainesville. Engineering and Industrial Experiment Station.
Responses of FM/CW Systems having Filters.
Contractor rept.,
Peyton Z. Peebles, Jr. Feb 82, 16p HDL-CR-82-116-1
Contract DAAK21-81-C-0116

The response of a typical FM/cw system's receiver is usually developed by assuming filters at the output of certain mixers are broadband relative to the signals they process. By assuming these filters have arbitrary transfer functions, a new analysis leads to a more general response that is applicable to a broad range of FM/cw system architectures. The response is developed in a form suitable for computer computation. (Author)

AD-A117 609/8 PC **A10**/MF **A01**
CNR, Inc., Needham, MA.
Timing Subsystem Development.
Final technical rept.,
K. R. Backe. May 82, 214p RADC-TR-82-124
Contract F30602-78-C-0287

In the predominately digital DCS, a requirement exists to coordinate clocks at geographically distinct nodes to handle switched digital traffic and provide a general system timing capability. Aside from the characteristics of the clocks, medium, and link equipment, the synchronization technique itself is an important aspect in considering overall network performance. This document presents the findings of a program in which three experimental timing subsystem prototypes were designed, fabricated and field tested in a small network of troposcatter and microwave communications links. The purpose of this effort was to implement and evaluate the performance of each of five candidate timing techniques in a network environment. These candidates are: Independent Clocks, Master/Slave, Mutual Synchronization, Time Reference Distribution, and Improved Time Reference Distribution. This report includes discussions of the timing subsystem, measurement plan, and evaluation of the capabilities and performance characteristics of the candidate clock disciplining methods. Recommendations are presented based on the findings of the field tests and an evaluation of the design of both hardware and software portions of the timing subsystem prototype. (Author)

AD-A117 615/5 PC **A03**/MF **A01**
Dunlap and Associates, Inc., Darien, CT.
Development of a Lexicon for Intra-Cockpit Communications While Navigating at Nap-of-the-Earth (NOE) Altitude.
Final technical rept. 29 Aug 79-31 Oct 80,
Richard F. Bloom, and John W. Hamilton. 31 Oct 80, 41p ARI-RR-1300
Contract MDA903-79-C-0586
Supersedes AD-A102 782.

This report describes the background, approach and completion of a project to develop a lexicon (or word list) of terrain descriptors, terrain locators and navigational commands so as to facilitate efficient intra-cockpit communications while flying at NOE altitudes. A draft version of the lexicon was prepared and a preliminary validation exercise was conducted with experienced Army NOE aviators, Revisions were then made and a full-color illustrated lexicon was produced. Application of this lexicon can provide the Army with useful training, experience and research information.

AD-A117 721/1 PC **A02**/MF **A01**
M/A-COM Linkabit, Inc., San Diego, CA.
Earth Station Interface for Demand Assignment Applications.
Quarterly technical rept. 1 Apr-30 Jun 82,
John E. McCormick. 30 Jun 82, 12p
Contract MDA903-81-C-0638, ARPA Order-3674/5

The High Speed Burst Modem (LBM36A) processes data from the Interface Control and Codec Unit (LCC36A) and the Western Union Earth Station. The high bandwidth signal processing tasks, such as modulation, demodulation, preamble detection, etc., are primarily performed by special purpose hardware. The microprocessor is primarily designed to perform controlling and monitoring functions. The LBM36A is a functional enhancement of the LBM36 burst modem. Due to the nature of the enhancements, additional software must be created and integrated into the general structure. This can be done most clearly by modifying the LBM36 software structure from its present dual path format to a simpler one path structure. The LBM36A must perform all the previously mentioned functions in a manner identical to the LBM36. In addition, it must perform uplink tuning, downline loading, enhanced built-in-test, and other functions. This quarterly technical report will compare the LBM36 and the LBM36A software structures.

AD-A117 737/7 PC **A05**/MF **A01**
City Coll., New York.
Acquisition, Image and Data Compression.
Annual rept. 1 Mar 81-28 Feb 82,
Donald L. Schilling, and George Eichmann. 30 Apr 82, 97p AFOSR-TR-82-0567
Grant AFOSR-81-0169

This report discusses the following subjects: A new reservation-based multiple access packet switching technique applicable to packet communications using a satellite channel is proposed. The objective of this research is to optimize the system performance in terms of throughput and delay and to develop analytical models to analyze the scheme. (Author)

AD-A117 770/8 PC **A02**/MF **A01**
University of Southern California, Los Angeles. Dept. of Aerospace Engineering.
Combined Phase and Amplitude Demodulation.
Technical rept.,
R. S. Bucy, and A. J. Mallinckrodt. 29 Jul 81, 5p AFOSR-TR-82-0561
Grant AFOSR-76-3100
Pub. in IEEE Transactions on Automatic Control, vAC27 n2 p476-478 Apr 82.

No abstract available.

AD-A117 808/6 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.
Distributed Minimum Hop Algorithms,
Robert G. Gallager. Jan 82, 36p Rept no. LIDS-P-1175
Contract N00014-75-C-1183, ARPA Order-3045

The control of data communication networks (and any other large distributed systems) must be at least partly distributed because of the need to make observations and exert control at the various nodes of the network. When one also considers the desireability of letting networks grow (or shrink due to failures), it is reasonable to consider control algorithms with minimal or no centralized operations. In developing distributed algorithms for such control functions as routing and flow control, for example, it becomes evident that there are a number of simple network problems which arise repeatedly; distributed algorithms for solving these simple problems are then useful as building blocks in more complex algorithms. Mathematically we model the network as a connected undirected graph with, say, n nodes and e edges. Each node contains the facilities for doing computations, storing data, and sending and receiving messages over the adjoining edges. Messages are assumed to be transmitted without error but with an unknown variable finite delay. Successive messages in a given direction on a given edge are queued for transmission at the sending node,

are transmitted, arrive in the order transmitted and are queued waiting for processing by the receiving node.

ED-201 319 Not available NTIS
Battelle Memorial Inst., Columbus, OH. Columbus Labs.
Development of plans for Providing Public Telecommunications Services for the City of Columbus, Ohio.
Final rept.,
Girard W. Levy, and Carl J. Bloch. Nov 80, 180p
Prepared in cooperation with Ohio Dept. of Energy and Telecommunication, Columbus.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This report presents the requirements and plans for providing public telecommunications services for the city of Columbus. Included are a description and analysis of potential applications of public telecommunications services in the community: the design requirements and system specifications for a two-way cable interconnect linking a government telecommunications facility with each of the four cable system headends, the construction, installation, and test specifications for the interconnect system: an implementation plan and schedule for procurement and construction of the system; an estimate of the cost to construct the system; and a 5-year facilities plan for construction, operation, maintenance, and program production for the government telecommunications facility. The appendices include recommendations for public telecommunication policy structure in Columbus and

N82-27605/6 PC **A02**/MF **A01**
Societe Nationale Industrielle Aerospatiale, Les Mureaux (France).
Information Dissemination and Satellite Television Telematique et Diffusion Spatiale.
A. Dauguet. 1981, 11p SNIAS-821-422-101
Text in French. Presented at Journees Intern.: Telematique et Espace, Paris, 18-19 Mar. 1981.

Satellites dedicated to information dissemination (SBS; Telecom 1) are discussed and the potential of television satellites to contribute to this service is assessed. The joint Franco-German program, TDF-1/TV-Sat, is described. Due to video signal characteristics, considerable transmitting time is available for services, such as teletext. Telemessages are another possible use. Educational television and videotext systems can also be carried by satellite television. The modest cost of satellite television reception is pointed out. Rapid development of user interactive satellite telecommunications is forecast.

N82-27606/4 PC **A02**/MF **A01**
Societe Nationale Industrielle Aerospatiale, Les Mureaux (France).
Television Satellite Programs les Programmes de Television Directe.
P. Usunier. 1981, 17p SNIAS-821-422-102
Text in French. Presented at Journees Intern: Telematique et Espace, Paris, 18-19 Mar. 1981.

Why and how satellite television transmission is being done, especially TDF-1/TV-Sat, are considered. The need for satellite television is assessed in terms of extending areas of reception. Problems of optimal signal strength, installation cost, and spillover are assessed. Political, cultural, and commercial aspects are also covered. Diverse satellite television systems to date are compared. The TDF-1/TV-Sat program is outlined as a practical application of what until now has been only experimental. System characteristics and its modular design are shown. Possible uses beyond television (teletex; viewdata; videotext) are speculated on.

N82-27607/2 PC **A14**/MF **A01**
Bosch (Robert) G.m.b.H., Stuttgart (Germany, F.R.).
Electronic Video System: Phase 1.
Final Report.
G. Bock, W. Horstmann, H. E. Krueger, B. Mueller, and H. G. Mueller. Jan 82, 318p BMFT-FB-T-82-015, ISSN-0340-7608
In German, English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

The system concept (portable color camera with semiconductor image converters, integrated magnetic tape recording equipment and corresponding playback unit) can be implemented. A model of a CID hybrid camera was constructed. A miniaturized recorder for 0.15 in tape was assembled as a model. The problem of recording in color at narrow bandwidth was solved, using serial processing of compressed color signals (Timeplex). For this purpose, a digital concept was worked out after initial tests, using an analog method. It is possible to produce five-track single-turn heads as recording elements, using thin film technology. These heads, together with magnetoresistive playback heads, yield better results than combined inductive recording/playback elements.

N82-27608/0 PC **A04**/MF **A01**
Valvo G.m.b.H., Hamburg (Germany, F.R.).
VLSI Circuits for Teletext (Videotext) and Viewdata.
Final Report.
R. Vonvignau, and G. Staecker. Feb 82, 70p BMFT-FB-T-82-024, ISSN-0340-7608
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

The application of existing teletext decoders by the German television industry was investigated. Rapid development of circuits, based on the UK standard for videotext and viewdata, was stressed. Interactive videotext and broadcast videotext were considered. Dynamically redefinable character sets are discussed and the circuit design of a video display generator is presented. Modem and picture attributes are treated. The possibilities for VLSI of teletext decoder circuits are established. International standards of teletext data transmission are called for.

N82-27609/8 PC **A05**/MF **A01**
Forschungsinstitut fuer Anthropotechnik, Bonn (Germany, F.R.).
Influence of Contrast on Spatial Perception in TV Display of Moving Images Einfluss des Kontrastes Auf die Raumwahrnehmung bei TV -Flugaussensicht- Darstellungen.
H. Heising. Sep 81, 80p FB-50
In German; English Summary.

A low cost visual simulation system was developed which involves a hybrid computer controlled transformation of perspective on a raster scan TV display. It is applicable to a wide range of simulation tasks, including training and research, but is especially useful in facilitating detection of moving objects and reducing frame rate in RPV applications with a number of advantages, e.g., reduction of bandwidth and improved protection against jamming. Because of the perspective transformation in TV raster scan, a change of contrast can occur during the display of moving images. Therefore, it is of interest to know the effect of this contrast change on human spatial perception. The investigations undertaken led to the conclusion that the physical contrast in the ratio range of I:I to 1:25 (by a medium illuminance of 7 cd/sqm at the white parts of the picture) does not influence human distance and height judgments.

PB82-191974 CP **T07**
Federal Communications Commission, Washington, DC.
The Common Carrier Microwave Data Base.
Data file,
William L. Lannin. Jun 82, mag tape FCC/DF-82/014
Supersedes PB81-182636.
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions. Price includes documentation.

The Common Carrier Microwave Data Base contains station and antenna location information, signal path information and technical operating characteristics of Microwave Radio stations licensed by the Common Carrier Bureau of the FCC.

PB82-249715 PC **A06**/MF **A01**
Philips Forschungslaboratorium G.m.b.H., Hamburg (Germany, F.R.).
Automatic Recognition of Comparative Speakers,
E. Frehse, R. Geppert, R. Geirloff, M. H. Kuhn, and H. Ney. Jul 82, 107p BMFT-FB-DV-80-009
Trans. of mono. Automatische Erkennung Kooperativer Sprecher, n.p., Dec 80. See also N82-12319.

Speaker recognition is the identification of speakers by means of voice analysis. The research project concerned the automatic recognition of 'cooperative' speakers. In this connection it can be assumed that the speaker wants to be recognized. The system learns to identify speakers by means of speech samples. To this end, suitable sentences are chosen which lend themselves both to the learning phase of the system and to the actual recognition process. Various statistical features have been extracted in real time from speech samples by cooperative speakers and then processed for automatic identification and verification. On the basis of the most reliable feature, the long-term averaged spectrum, two prototypes have been set up: A minicomputer system with speaker reference on magnetic card for banking applications and a microprocessor device for automatic entry control purposes. The error rates for false reject and false accept are in the order of 2%.

PB82-873605 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Digital Communication Systems: Coding and Decoding. 1970-August, 1982 (Citations from the Engineering Index Data Base).
Rept. for 1970-Aug 82.
Aug 82, 225p

This bibliography contains citations concerning coding and decoding techniques for digital communication systems. Topics include error correction and detection, line codes, single channel codec, timing aspects, and speech processing. Cryptograph, encryption techniques, and channel encoding are discussed. (Contains 247 citations fully indexed and including a title list.)

PB82-873639 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Digital Communication Systems: Multiplexing and Switching. 1970-August, 1982 (Citations from the Engineering Index Data Base).
Rept. for 1970-Aug 82.
Aug 82, 286p

This bibliography contains citations concerning multiplexing and switching techniques for digital communication systems. Time and frequency division multiplexing technique, PCM multiplexer, switching circuits and processes are discussed. Equipment operation and maintenance, system analysis, design criteria, and performance evaluation are considered. (Contains 320 citations fully indexed and including a title list.)

PB82-873779 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Delta Modulation. 1970-August, 1982 (Citations from the NTIS Data Base).
Rept. for 1970-Aug 82.
Aug 82, 155p
Supersedes PB82-854472.

This bibliography contains citations concerning the theory and applications of delta modulation. Disturbance and noise filters, data encoding and equipment design are presented. Applications include voice transmission and facsimile coding. (This updated bibliography contains 130 citations, 34 of which are new entries to the previous edition.)

PB82-873811 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Digital Communication Systems: Interference. 1970-August, 1982 (Citations from the Engineering Index Data Base).
Rept. for 1970-Aug 82.
Aug 82, 272p

This bibliography contains citations concerning interference analysis of digital communication systems. Topics include digital and radio transmission systems, signal interference and noise, bit error rate, phase shift keying, and pulse code modulation. Interference and noise immunity, fading multipath environments, error probability, error rate monitoring techniques, pulse and quantization noise, radio telephone, and mobile radio systems are discussed. (Contains 303 citations fully indexed and including a title list.)

17D. Electromagnetic and Acoustic Countermeasures

AD-A117 424/2 PC **A02**/MF **A01**
Army Materials and Mechanics Research Center, Watertown, MA.
Attenuation of High Intensity Reradiated Light by Photochromic Glass.
Conference paper,
Thomas V. Hynes. 18 Jun 82, 5p
Paper from the Proceedings of the Army Sciences Conference (1982), 15-18 Jun 82.

One possible threat mechanism by which High Energy Laser Weapons may exploit the vulnerability of U.S. Army systems is through the production of large fluences of reradiated visible light when glass surfaces such as windscreens, vision blocks or lenses are struck by pulsed or cw laser radiation. At 10.6 meter laser wave lengths silicate glasses have very shallow absorption depths and, hence, heat to incandescence rapidly. Such blackbody surfaces at temperatures of 3000 (C+) will reradiate strongly in the visible region of the spectrum. In addition, if pulsed laser conditions are such that air plasmas are formed on the target, blackbody temperatures of 17,000 C may be obtained. This paper does not attempt to address flashblindness conditions; rather it focuses on the enhanced attenuation of the visible light in the optical materials behind the target surface. This paper reports a set of experiments to test the concept of the photochromic glass response as countermeasure against the visible reradiation obtained when transparent materials are irradiated by high energy lasers. In all of the experiments, a fused silica face plate (chose because of ultraviolet (uv) transparency) was the target and a laminate of four layers of the photochromic glass was placed behind the fused silica. Attenuation of visible light traversing the photochromic glass was measured.

AD-A117 663/5 PC **A10**/MF **A01**
Cramer (H.E.) Co., Inc., Salt Lake City, UT.
Analysis of Multiple Source Obscurants on the Realistic Battlefield (AMSORB). Volume I. Mathematical Models and Computer Program Description.
Final rept.,
Richard K. Dumbauld, Steven F. Saterlie, and Craig S. Cheney. May 82, 221p ERADCOM/ASL-CR-82-0122-1
Contract DAAD07-79-C-0122

The Analysis of Multiple Source Obscurants on the Realistic Battlefield (AMSORB) computer program is designed to calculate line of sight integrated concentrations, transmittance and probability of detection in a polluted battlefield environment. Provision is made in the program for treatment of pollutants from smoke munitions, explosive munitions, moving vehicles, muzzle blasts, burning vegetation, vehicles, and buildings. The program calculates wind fields in complex terrain and uses this information to calculate cloud trajectories of the pollutants and the line of sight integrated concentrations, transmittance and probability of detection between user-specified points (observer and target). Volume I of the report describes: the wind field, trajectory/transport and dispersion models; the source characteristics used in the program; the AMSORB model routines; and the general structure of the program.

17E. Infrared and Ultraviolet Detection

AD-A117 916/7 PC **A04**/MF **A01**
Analysis and Technology, Inc., North Stonington, CT.
Preliminary Assessment of U.S. Coast Guard Short Range Recovery (SRR) Forward Looking Infrared (FLIR) System Small Target Detection Performance.
Interim rept. Sep 81-May 82,
S. R. Osmer, L. Nash, G. L. Hover, and T. J. Mazour. May 82, 75p USCG-D-20-82, CGR/DC-6/82
Contract DT-CG-39-81-C-80287

Forward Looking Infrared (FLIR) detection data have been collected in a dedicated electronic detection experiment conducted in 1981 by the U.S.C.G. Research and Development Center. This experiment was part of a series designed to improve search planning guidance contained in the National Search and Rescue Manual. An HH-52A helicopter equipped with a prototype Northrop Corp. SeeHawk FLIR system conducted detection runs with 15- to 19-foot fiberglass boats, 4- and 7-man life rafts, and simulated person-in-water (PIW) targets. The tests were conducted in Block Island Sound during September through November 1981.

PAT-APPL-6-353 682 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Target for Optically Activated Seekers and Trackers.
Patent Application,
Charles T. Lakin, and Norman F. Wilett. Filed 1 Mar 82, 12p AD-D009 560/4
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This abstract discloses a target for optically activated seekers and trackers (TOAST) which provides for calibrated and variable target characteristics such as size, intensity, spatial position, color and interfering background. The TOAST has a first illumination system providing a target light beam through an adjustable iris which controls image size. The target beam passes through a collimator lens which focuses the light at infinity. With the target beam focused at infinity, the motion of an elevation plate lengthens or shortens the distance from the collimator lens to the one motion mirror. The target beam is attenuated by a variable filter driven by a servo-motor, and a color selection process is provided by passing the beam through spectral filters. A traveling lens and attendant traveling mirror lengthen or shorten the distance from the one motion mirror to the traveling lens and traveling mirror, which is orthogonal with the one motion mirror, thus providing an X-Y movement of the target image formed by the traveling lens. The target image is formed in a plane and reflected by a beamsplitter mirror to main objective lens which emanates the light focused at infinity. A background light beam with background imagery is provided to the beamsplitter mirror and mixed with the target image so as to simulate the target environment encountered by an operating optically activated seeker and tracker.

PAT-APPL-6-358 941 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Sensitized Epitaxial Infrared Detector.
Patent Application,
Alan C. Bouley, Harold R. Riedl, and James D. Jensen. Filed 17 Mar 82, 11p AD-D009 578/6
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An infrared sensitive photodiode which is made of an epitaxial layer of a semiconductor alloy which is a lead chalcogenide, a lead-tin chalcogenide, or a lead-cadmium chalcogenide grown on a single crystal substrate of an infrared transparent, electrically insulating material, an Ohmic contact deposited on the epitaxial layer, and a non-Ohmic Pb metal contact deposited on the epitaxial layer to form a Schottky barrier, the improvement comprising the inclusion of halide ions in the interface region between the non-Ohmic lead metal contact and the epitaxial layer of semiconductor material. (Author)

17G. Navigation and Guidance

AD-A117 640/3 PC **A03**/MF **A01**
Federal Aviation Administration, Washington, DC. Systems Research and Development Service.
Study of the Frequency Assignment Congestion in the Ultra High Frequency Air Traffic Control Air/Ground Communication Band.
Final rept.,
Charles W. Cram. Apr 82, 32p Rept no. DOT/FAA/RD-82/29

To provide air traffic control of military aircraft operating in the National Airspace System, the Federal Aviation Administration (FAA) makes use of frequencies in the 225 - 400 MHz (UHF) band which is normally administered by the Department of Defense. In 1970 the Military Communications and Electronics Board (MCEB) announced their intention to implement 25 kHz channel spacing in the UHF band. In 1976, the MCEB published an implementation plan which allotted 274 channels for use by the FAA for air traffic control. The purpose of the following study is to determine if the 274 channels made available will be sufficient to satisfy existing and future communication requirements for air traffic control of military aircraft. The study will also show how much additional spectrum support would be required if the 274 channels allotted are not sufficient and possible geographic areas where this additional support would be most necessary.

AD-A117 664/3 PC **A04**/MF **A01**
Federal Aviation Administration, Washington, DC. Office of Systems Engineering Management.
Preliminary Analysis of the Benefits and Costs to Implement the National Airspace System Plan,
S. M. Horowitz, and S. B. Poritzky. Jun 82, 62p Rept no. FAA-EM-82-22
Report on An Economic Justification for the NAS Plan.

The many individual programs which comprise the National Airspace System Plan are designed to provide more air traffic control service to the aviation users at reduced operating costs to the FAA. The FAA is able to justify its investment in the NAS Plan by a cost/effectiveness argument. The benefits and costs to the aviation users are the focus of this report. By using example cases to quantify a portion of the potential dollar benefits that would be available to the aviation user as a result of the FAA's implementation of its NAS Plan, this report concludes that the added benefits to the users exceed the users' added costs in avionics equipment by a large margin. (Author)

AD-A117 863/1 PC **A08**/MF **A01**
Transportation Systems Center, Cambridge, MA. Research and Special Programs Administration.
Flight Evaluation of LORAN-C in the State of Vermont.
Final rept. Jul 79-May 81,
F. D. Mackenzie, and C. D. Lytle. Sep 81, 162p Rept no. DOT-TSC-RSPA-81-10

The Transportation Systems Center, Langley Research Center, the Federal Aviation Administration, and the Agency of Transportation, State of Vermont conducted a program sponsored by the Research and Special Programs Administration of the Department of Transportation to evaluate LORAN-C as a supplement to existing navigation aids for general aviation aircraft, particularly in mountainous regions of the United States and where VOR coverage is limited. This report highlights results obtained in completing 215 non-precision approaches and 104 flights. The flights, initiated in the summer months, extend through four seasons and practically all weather conditions typical of northeastern U.S. operations have been experienced.

AD-A117 897/9 PC **A05**/MF **A01**
Federal Aviation Administration, Washington, DC. Systems Research and Development Service.
Evaluation of Four-Color Plan View Display Console.
Final rept. Jun 78-Oct 81,
John W. Aschenbach, Alan J. Kopala, and Lauren N. Douglass, Jr. Jun 82, 93p Rept no. DOT/FAA/RD-82/46
See also Rept. no. FAA-RD-75-39 dated May 75, AD-A010 779.

Technical and operational evaluations were conducted on Plan View Displays (PVDs) modified for both four-color and monochrome presentation. Two of six PVDs modified for color were tested and evaluated for display performance at the Federal Aviation Administration (FAA) Technical Center in Atlantic City, New Jersey. Data were collected on brightness and resolution, power consumption, color registration, character legibility and position accuracy, and distortion in the broadband or 'TV' mode. A registration board failure analysis, a maintainability analysis, and a radio frequency radiation survey were also performed. All six color PVDs were subjectively evaluated for operational suitability at the Washington Air Route Traffic Control Center (ARTCC) in Leesburg, Virginia. Data were collected to determine controller's reactions on the operational use of multicolor PVDs from questionnaires and taped interviews. (Author)

AD-A117 909/2 PC **A02**/MF **A01**
Naval Research Lab., Washington, DC.

Prototype Design and Initial Test Evaluation of a Global-Positioning-System Time-Transfer Receiver (GPS TTR).
Interim Rept.,
O. Jay Oaks, Jr., Alick H. Frank, Stanley R. Falvey, Mark J. Lister, and James A. Buisson. 27 Jul 82, 18p Rept no. NRL-8608

Time-transfer equipment and techniques used with the NRL Navigation Technology Satellites have been modified and extended for use with the GPS satellites. A prototype receiver was built and field tested at NASA's Kennedy Spaceflight Center. The receiver uses the GPS L-band link at 1575 MHz with only the course-acquisition code to resolve a measured range to the satellite. A theoretical range is computed from the satellite ephemeris transmitted in the data message and the user's coordinates. Results of user offset from GPS time are obtained by differencing the measured and theoretical ranges and applying calibration corrections. (Author)

N82-27259/2 PC **A02**/MF **A01**
Ohio Univ., Athens. Avionics Engineering Center.
A LORAN-C Prototype Navigation Receiver for General Aviation.
R. W. Lilley, and D. L. Mccall. Aug 81, 25p NASA-CR-169118, NAS 1.26:169118
Presented at the 4TH Digital Avionics Systems Conf., St. Louis, Nov. 1981.

Prototype equipment was developed for flight evaluation which provides enroute navigation in both latitude-longitude and rho-theta coordinates. The nonprecision approach capabilities of this equipment was evaluated. The antenna/preamplifier coupler, the RF processor, tracking loop hardware, tracking loop software, and the video output are discussed. Laboratory and flight test results are evaluated.

PAT-APPL-6-376 474 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
A Digital Compass Having a Ratiometric Bearing Processor.
Patent Application,
Daniel Stephen Lenko. Filed 10 May 82, 22p AD-D009 575/2
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A digital compass is described including a two-axis earth's magnetic field sensor and a bearing processor computes the bearing for local display or transmission from a remote site to a local site for display and/or storage. The bearing processor portion of the digital compass includes an analog-to-digital converter configured for ratiometric measurements to compute the ratio of the x-axis and y-axis signals (smaller divided by the larger) from the aforementioned two-axis earth's magnetic field sensor. A programmable memory unit controlled, inter alia, by the data line outputs of the analog-to-digital converter, contains the arc tangent function for angles from 0 to 90 degrees. The data line outputs from the memory unit defines a quadrant displacement angle in the range of 0 degrees to 90 degrees which is subsequently added to the cardinal point forming the lower boundary in bearing of the host quadrant. (Author)

PATENT-4 324 378 Not available NTIS
Department of the Navy, Washington, DC.
High-Torque/Acceleration Stabilized Sensor Platform.
Patent,
Frederick D. Groutage. Filed 3 Mar 80, patented 13 Apr 82, 6p AD-D009 553/9, PAT-APPL-6-126 778
Supersedes PAT-APPL-6-126 778, AD-D007 077.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This document describes a powered gimbal high torque/acceleration stabilized platform including an outer gimbal ring and gimbal torquer and an inner gimbal gear and torque motor. The inner gimbal torque motor is secured to the outer gimbal ring to permit increased weight and volume sensors to be packaged and located at the center of rotation of the gimbal axis.

17H. Optical Detection

AD-A117 413/5 PC **A04**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Ground-Based Electro-Optical Detection of Artificial Satellites in Daylight from Reflected Sunlight.
Project rept.,
Eugene W. Rork, Shaoann S. Lin, and Anthony J . Yakutis. 25 May 82, 56p Rept no. ETS-63
Contract F19628-80-C-0002

An electro-optical sensor consisting of the ETS 31-inch f/5 telescope, a readily-available silicon vidicon TV camera, and a video signal processing system was used to acquire and track low altitude satellites in daylight from reflected sunlight. The limiting magnitude was 8m3. In demonstrating this, a total of 20 satellite tracks on 18 different satellites was achieved in full daylight during one day, and accurate precision positional data on 13 of the tracks were sent to the NORAD Space Defense Center. This demonstrated proof-of-concept might provide an enhanced GEODSS daylight operation. In connection with experiments in daylight space surveillance, an atmospheric phenomenon was encountered which consists primarily of point images, apparently windblown, moving through the field-of-view. The leading candidates are seed vehicles, insects, and ice crystals. A parallax technique has been demonstrated to separate these objects, dubbed 'angels,' from artificial satellites.

AD-A117 595/9 PC **A03**/MF **A01**
Charles Stark Draper Lab., Inc., Cambridge, MA.
ACOSS Eleven (Active Control of Space Structures). Volume I.
Interim rept. May-Nov 81,
Thomas H. Brooks, Virenda N. Mahajan, Jiguan G. Lin, Glenn J. Kissell, and Daniel R. Hegg. May 82, 33p CSDL-R-1536-VOL-1, RADC-TR-82-131-VOL-1
Contract F30602-81-C-0180, ARPA Order-3655
See also Volume 2, AD-A117 596.

The Active Control of Space Structures (ACOSS) Eleven contract includes three distinct areas of endeavor: Simulations Extensions, HALO Optics and ACOSS. This report covers the work performed in each of these areas between May and November 1981. Simulations Extension and HALO Optics are presented in Volume I and ACOSS is presented in Volume II. (Author)

AD-A117 596/7 PC **A07**/MF **A01**
Charles Stark Draper Lab., Inc., Cambridge, MA.
ACOSS Eleven (Active Control of Space Structures). Volume II.
Interim rept. May-Nov 81,
Thomas H. Brooks, Virenda N. Mahajan, Jiguan G. Lin, Glenn J. Kissell, and Daniel R. Hegg. May 82, 137p CSDL-R-1536-VOL-2, RADC-TR-82-131-VOL-2
Contract F30602-81-C-0180, ARPA Order-3655
See also Volume 1, AD-A117 595.

The Active Control of Space Structures (ACOSS) Eleven contract includes three distinct areas of endeavor: Simulations Extensions, HALO Optics and ACOSS. This report covers the work performed in each of these areas between May and November 1981. Simulations extension and HALO Optics are presented in Volume I and ACOSS is presented in Volume II. (Author)

17I. Radar Detection

AD-A117 414/3 PC **A02**/MF **A01**
Naval Research Lab., Washington, DC.
End-Fire Hybrid Array Antennas.
Interim rept.,
W. K. Kahn. 12 Jul 82, 22p Rept no. NRL-8596

A heuristic approach useful in the design of end-fire array antennas is described. When an array is scanned 'beyond end fire,' the last elements of the array, in the direction of the end-fire beam, generally receive net power transmitted by other elements of the array. This received power might conceivably be recirculated and reradiated at the price of substantial complexity in the feed network. It is relatively simple to absorb this power in appropriate resistive loads at the price of reduced gain. A compromise alternative, termination of these end elements in reactive loads especially determined to preserve pattern characteristics is examined. (Author)

AD-A117 415/0 PC **A03**/MF **A01**
Naval Research Lab., Washington, DC.
Properties of Even-Length Barker Codes and Specific Polyphase Codes with Barker Type Autocorrelation Functions.
Interim rept.,
Shimshon Gabbay. 12 Jul 82, 40p Rept no. NRL-8586

Properties of even-length Barker codes, if they exist, are derived. The analysis leads to the analysis of polyphase codes. Similar properties are derived for specific types of polyphase codes, with Barker type autocorrelation functions. The analysis is done in the time and frequency domains (including linear algebra and Z transform treatments), and suggests a procedure to search for codes with Barker type autocorrelation functions. The search problem is reduced by using the properties of such codes.

AD-A117 512/4 PC **A03**/MF **A01**
Federal Aviation Administration, Washington, DC. Systems Research and Development Service.
Direct Aircraft Velocity Determination by L-Band Moving Target Detector Radar.
Final rept.,
James A. Shannon. Jun 82, 41p Rept no. DOT/FAA/RD-82/41

The Moving Target Detector (MTD) radar can be used to measure the phase difference of echoes from aircraft returns. From these measurements one can determine directly the radial component of aircraft velocity. Present practice is to determine velocity indirectly from radar position measurements. Results of measuring phase shift differences and corresponding aircraft velocities using an L-Band MTD radar are presented. Observations were made in a clutter free environment. The standard deviation of phase shift differences made from observations on a B727 airplane at a distance of 100 nmi was generally found to be 5 degrees, corresponding to a standard deviation of velocity component of 1.2 knots. The standard deviation of phase shift observed from six slower moving airplanes indicates the standard deviation of phase is generally 18 degrees or less, corresponding to a standard deviation of velocity component of 4.3 knots or less. Reliability is generally 94% for the B727 airplane and about 90% for the small airplanes, although poorer reliability is observed with tangential flight paths. Direct measurement of velocity can be used to provide increased precision in predicting aircraft motion over the short term (2 minutes).

AD-A117 666/8 PC **A02**/MF **A01**
Federal Aviation Administration Technical Center, Atlantic City, NJ.
Memory and Computational Requirements for Tracking in the Advanced Computer System.
Final rept. Feb 81-Feb 82,
Robert E. Lefferts. Jun 82, 25p DOT/FAA/CT-82/46, DOT/FAA/RD-81/75

Computational and memory requirements of various tracking algorithms were examined for possible application with the 9020 replacement computer. For a wide range of algorithms, including those most likely to be of interest, there are no technological factors which would significantly impact the choice of algorithms given the present state of computer technology. Further, within the next few years, technological advances will totally eliminate memory and computational tracking requirements from significantly impacting system design. It is concluded that the only substantive limitation currently imposed on the selection of tracking algorithms is the ability of the system designer to analyze, specify, test, and evaluate the most promising algorithm. (Author)

AD-A117 691/6 PC **A05**/MF **A01**
Federal Aviation Administration Technical Center, Atlantic City, NJ.
Improving Conflict Alert Performance Using Moving Target Detector Data.
Final rept. Oct 79-Sep 80,
Robert E. Lefferts. Jun 82, 85p DOT/FAA/CT-81/17, DOT/FAA/RD-82/47

The feasibility of using measurements of aircraft radial velocity to improve the performance of the en route tracking algorithm in the present computational envi-

ronment was examined. Radial velocity can be measured with equipment which is part of the Moving Target Detector (MTD) radar, a new type of search radar. Particular attention is paid in this report to the utilization of radial velocity in reducing speed and heading biases that occur during maneuvers. The performance of the tracking and Conflict Alert algorithms is evaluated on five maneuver detection/observation methods, including the present method. Using both standard and track-oriented parameters yields a total of ten different analyses. A simplified simulation program produces quantitative data. Because the computational resources available for tracking algorithm modifications are limited, consideration of possible applications of radial velocity measurements is restricted to simple algorithm changes. Two aspects of performance are measured: the warning time to a hazardous situation, and the nuisance alert area, a recently developed measure of the false alarm performance of the algorithms. It was concluded that the use of the radial velocity data was not justified in the present systems givent the limited computer resources available. The practically of using radial velocity data in the more extensive system of the future is briefly considered. (Author)

N82-27604/9 PC **A04**/MF **A01**
Marconi Co. Ltd., Chelmsford (England).
The SAR/Scatterometer Study (SAR in 2D-2FS Operation).
Final Report.
A. B. E. Ellis, and C. Hodge. 16 Feb 81, 53p Y/215/587/, ESA-CR(P)-1548
Contract ESA-4587/81/F-DD(SC)

Ocean scatterometer and SAR equipment commonality on ERS-1 was examined. Reduction of mean power and the effects of reduction on the system, and data handling prior to recording and transmission to the ground were studied. Mean power can best be reduced by reducing pulse length while maintaining bandwidth. The short pulse lengths of the SAR and wave scatterometer are compatible with the SAR klystron. A separate TWT is proposed for the wind scatterometer. Since this is a long pulse transmitter, the klystron is regunned in order to enable it to operate in a long pulse mode if the TWT fails. Data processing software and hardware choice depends on the amount of auxiliary data required and synchronizing problems associated with each system in the final configuration.

PATENT-4 319 242 Not available NTIS
Department of the Navy, Washington, DC.
Integrated Weapon Control Radar System.
Patent,
Bernard L. Lewis. Filed 4 Mar 80, patented 9 Mar 82, 6p AD-D009 528/1, PAT-APPL-6-127 014
Supersedes PAT-APPL-6-127 014, AD-D007 994.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A system for integrating weapon control radars which operate at the same or different frequency bands, and for permitting every weapon control radar, for example on a ship, to lock through every weapon control antenna, thereby enabling all radars to be used against all targets, includes interconnecting broad-band antennas that can be time - and/or frequency-shared by all the radars. Each antenna has a coaxial monopulse feed at the various bands of operation. Each antenna also includes a switch for time-sharing the radars either simultaneously or sequentially into the antenna. A second switch for each antenna sends the radar outputs associated with each antenna to a control system for that antenna and its associated weapon launcher.

PATENT-4 323 897 Not available NTIS
Department of the Navy, Washington, DC.
Target Detecting Device with Improved Counter-Countermeasures Capability.
Patent,
Robert A. Creighton, and Stephen M. Engel. Filed 22 May 70, patented 6 Apr 82, 4p AD-D009 554/7, PAT-APPL-040 522
Supersedes PAT-APPL-040 522-70.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This invention relates to a system which in response to a received signal, alters the transmit characteristics in a manner that cannot be predicted by any enemy attempting to jam the target detecting device and has no effect on the inherent probability of detecting a target. Any signal passed by the threshold of the receiver is processed and fed to the pulse repetition frequency generator and will randomly change the pulse repetition frequency of the transmitted signal.

18.

NUCLEAR SCIENCE AND TECHNOLOGY

18A. Fusion Devices (Thermonuclear)

DE82008101 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Resistive MHD Studies of High-beta Tokamak Plasmas.
V. E. Lynch, H. R. Hicks, J. A. Holmes, B. A. Carreras, and L. Garcia. Feb 82, 49p ORNL/TM-8082
Contract W-7405-ENG-26
Portions of this report are illegible.

Numerical calculations have been performed to study the magnetohydrodynamic (MHD) activity in high-beta tokamaks such as ISX-B. These initial value calculations have been built on earlier low-beta techniques, but the beta effects create several new numerical issues. These issues are discussed and resolved. In addition to time-stepping modules, our system of computer codes includes equilibrium solvers (used to provide an initial condition) and output modules, such as a magnetic field line follower and an x-ray diagnostic code. The transition from current-driven modes at low beta to predominantly pressure-driven modes at high beta is described. The nonlinear studies yield x-ray emissivity plots which are compared with experiment. (ERA citation 07:048725)

DE82008142 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
VMOMS: A Computer Code for Finding Moment Solutions to the Grad-Shafranov Equation.
L. L. Lao, R. M. Wieland, W. A. Houlberg, and S. P. Hirshman. Feb 82, 57p ORNL/TM-7871
Contract W-7405-ENG-26
Portions of this report are illegible.

A code VMOMS is described which finds approximate solutions to the Grad-Shafranov equation describing scalar pressure-balance equilibria for axisymmetric tokamak plasmas. A Fourier series expansion of the flux surface coordinates (R,Z) is made in terms of two new coordinates (rho, theta), and the resulting equation is conveniently reduced to a system of ordinary differential equations (ODE's) using a variational principle. The solution of these simple equations with pressure and current as driving functions, yields, in principle, a complete description of the equilibrium. Complete axisymmetry is assumed, as well as up-down symmetry about the toroidal midplane. (ERA citation 07:048838)

DE82009145 MF **A01**
Lawrence Livermore National Lab., CA.
Studies for a Fusion Technology Development Facility.
J. N. Doggett. 9 Mar 82, 14p UCRL-86972, CONF-820347-1
Contract W-7405-ENG-48
US-Japan seminar/workshop (A-19) open systems studies, Nagoya, Japan, 15 Mar 1982.
Best available copy from document source. Available in microfiche only.

We have been studying small, driven fusion reactors as candidates for a Technology Development Facility (TDF) to be used for testing reactor subsystems, components, and materials. Magnetic mirror systems are particularly interesting for this application because of their inherent steady-state operation, potentially high wall loading, and relatively small size. The systems so far studied have 14-MeV neutron wall loads ranging from 1 to 3 MW m exp -2 on testing surface areas of 2 to 5 m exp 2 with annual fluences as high as 10 exp 21 neutrons cm exp -2 . These devices are based on physics and engineering that has been demonstrated or is scheduled for demonstration in the next year. (ERA citation 07:045382)

DE82009360 PC **A05**/MF **A01**
Lawrence Livermore National Lab., CA.
Mirror Fusion. Quarterly Report, April-June 1981.
11 Sep 81, 83p UCRL-50051-81-2
Contract W-7405-ENG-48

The information in each Quarterly is presented in the same sequence as in the Field Work Package Proposal and Authorization System (WPAS) submissions prepared for the U.S. Department of Energy; the main sections are Applied Plasma Physics, Confinement Systems, Development and Technology, and Mirror Fusion Test Facility (Planning and Projects). On occasion, we shall include information pertaining to the LLNL role as Lead Laboratory for the Open Systems Mirror Fusion Program. Each of these sections is introduced by an overall statement of the goals and purposes of the groups reporting in it. As appropriate within each section, statements of the goals of individual programs and projects are followed by articles containing summaries of significant recent activity and descriptive text. (ERA citation 07:045375)

DE82009384 PC **A05**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Plasma Fusion Center.
Radial Effects in Heating and Thermal Stability of a sub-Ignited Tokamak.
V. Fuchs, M. M. Shoucri, G. Thibaudeau, L. Harten, and A. Bers. Feb 82, 86p DOE/ET/51013-32, PFC/RR-82-6
Contract AC02-78ET51013
Microfiche only after original copies are exhausted.

The existence of thermally stable sub-ignited equilibria of a tokamak reactor, sustained in operation by a feedback-controlled supplementary heating source, is demonstrated. The establishment of stability depends on a number of radially non-uniform, nonlinear processes whose effect is analyzed. One-dimensional (radial) stability analyses of model transport equations, together with numerical results from a 1-D transport code, are used in studying the heating of DT-plasmas in the thermonuclear regime. Plasma core supplementary heating is found to be a thermally more stable process than bulk heating. In the presence of impurity line radiation, however, core-heated temperature profiles may collapse, contracting inward from the limiter, the result of an instability caused by the increasing nature of the radiative cooling rate, with decreasing temperature. Conditions are established for the realization of a sub-ignited high-Q, toroidal reactor plasma with appreciable output power (approx. = 2000 MW thermal).

DE82009630 MF **A01**
Oak Ridge National Lab., TN.
Design of FIR Lasers with Integrated Pump Lasers.
D. P. Hutchinson, C. H. Ma, T. R. Price, P. A. Staats, and K. L. Vander Sluis. 1982, 8p CONF-820125-3
Contract W-7405-ENG-26
US/Japan workshop on sub-millimeter diagnostic techniques, Nagoya, Japan, 18 Jan 1982.
Best available copy from document source. Available in microfiche only.

Tokamak diagnostics require high-power, compact, stable FIR sources for plasma diagnostics. In an effort to meet these requirements at ORNL, we have developed an FIR/CO sub 2 laser package that has operated in the rather harsh environment of the ISX-B tokamak experiment for approx. 5000 discharges totaling an operating time of approx. 3000 h. We have continually strived to improve the basic design first conceived over five years ago. (ERA citation 07:045247)

DE82009634 MF **A01**
Varian Associates, Inc., Palo Alto, CA.
Gyrotron Oscillators for Fusion Heating.
H. Jory, S. Evans, K. Felch, J. Shively, and S. Spang. 1982, 9p CONF-820345-1

Contract W-7405-ENG-26
Symposium on heating in toroidal plasmas, Grenoble, France, 22 Mar 1982.
Best available copy from document source. Available in microfiche only.

Recent experiments have been performed to determine the ultimate power capability of a 28 GHz 200 kW CW gyrotron design. A power output of 342 kW CW was measured in these tests with an efficiency of 37%. Progress in the development of 60 GHz 200 kW pulsed and CW gyrotrons is discussed. An output of 200 kW with 100 msec pulse length has been achieved with the pulsed design. (ERA citation 07:045315)

DE82009938 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Second-Cyclotron-Harmonic Emission Measurements on ISX-B.
A. G. Kulchar, J. B. Wilgen, A. C. England, O. C. Eldridge, and C. M. Loring. Apr 82, 33p ORNL/TM-8200
Contract W-7405-ENG-26
Microfiche only after original copies are exhausted.

Second harmonic cyclotron radiation was used to measure the electron temperature during electron cyclotron heating (ECH) on the Impurity Study Experiment (ISX-B) tokamak. The 58-GHz and 70-GHz microwave superheterodyne receivers used for the measurements are described in detail. The limitations of the use of cyclotron radiation for a temperature measurement are quantified in terms of both the density and the temperature. A comparison is made between the results from the microwave diagnostics and those from the laser Thomson scattering to demonstrate that the cyclotron emission is thermal. A brief discussion of sensitivity to runaways and to other nonthermal populations is given. (ERA citation 07:045295)

DE82011507 MF **A01**
Oak Ridge National Lab., TN.
Faraday-Rotation Measurements in ISX-B.
D. P. Hutchinson, C. H. Ma, P. A. Staats, and K. L. Vander Sluis. 1982, 16p DOE/NBM-2011507
Contract W-7405-ENG-26
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

A submillimeter-wave, phase-modulated polarimeter/interferometer is used for simultaneous time-dependent measurement of line-averaged electron density and poloidal field-induced Faraday rotation along chords of the plasma column in ISX-B tokamak. Heterodyne detection and hollow dielectric waveguide are utilized to achieve the high sensitivity required for the multichord experiment. A data analysis code has been developed to reconstruct the asymmetric distributions of plasma density. The validity of the code is examined, and the result shows good agreement with density profiles measured by Thomson scattering. (ERA citation 07:048694)

DE82011967 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Ion Cyclotron Heating Experiments in EBT-S.
F. W. Baity, W. A. Davis, O. C. Eldridge, J. C. Glowienka, and D. L. Hillis. 1982, 11p CONF-820345-3
Contract W-7405-ENG-26
Symposium on heating in toroidal plasmas, Grenoble, France, 22 Mar 1982, Portions of document are illegible.

Fast-wave heating and propagation experiments in the ion cyclotron range of frequencies (ICRF) have been carried out on EBT-S under steady-state conditions at power levels up to 20 kW and under pulsed conditions at power levels up to 100 kW. The waves were launched using a single Faraday-shielded loop antenna installed on the midplane of one of the 24 cavity sectors. Substantial ion heating was observed at frequencies above the second harmonic for hydrogen plasmas and at frequencies above the third harmonic for deuterium plasmas, corresponding with the onset of wave propagation around the torus. The heating under these conditions is anomalous. In the case of deuterium plasmas, a small residual concentration (2 to 5%) of hydrogen was heated, but this component did not appear to affect the deuterium heating.

DE82011991 MF **A01**
Los Alamos National Lab., NM.
High-Energy Electron Generation and Transport in CO sub 2 -Laser-Heated Plasmas.
D. V. Giovanielli. 1982, 24p LA-UR-82-734, CONF-820528-2
Contract W-7405-ENG-36
US/Japan seminar on theory and application of multiple ionized plasmas produced by laser and particle beams, Nara, Japan, 2 May 1982.
Best available copy from document source. Available in microfiche only.

The primary goal of the Inertial Fusion Program at Los Alamos is to demonstrate the feasibility of burning (fusing) a large fraction of a small mass (less than 1 mg) of DT fuel. A major portion of our program is devoted to examining the physics of CO sub 2 -laser-irradiated targets. In addition, projects are continuing in the development of other lasers and heavy ion accelerators, and relativistic electron beam plasma heating, as possible alternate drivers. Our objective is to provide the necessary useful energy to a fusion capsule (0.2 to 2 MJ) at the lowest cost. A review of the Los Alamos program is given. (ERA citation 07:045349)

DE82012041 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Electron Cyclotron Resonant Heating (ECRH) Diagnostic System on TMX.
F. E. Coffield, and D. H. Griffin. 20 Oct 81, 4p UCRL-85949, CONF-811040-173
Contract W-7405-ENG-48
Symposium on engineering problems of fusion research, Chicago, IL, USA, 26 Oct 1981.

The ECRH diagnostics system monitors the net power delivered to the plasma by four 200-kW gyrotron oscillators, the frequency of each gyrotron, and some operating parameters of the gyrotron power supply system. The combination CAMAC- and GPIB-based data acquisition system is under desktop computer control that provides the capability for data conversion and display. The data acquisition system is also interfaced to the main computer system that acquires and archives the data. (ERA citation 07:045308)

DE82012215 MF **A01**
Lawrence Livermore National Lab., CA.
Magnetron CO-Sputtering System for Coating ICF Targets.
E. J. Hsieh, S. F. Meyer, W. G. Halsey, G. T. Jameson, and F. J. Wittmayer. 9 Dec 81, 7p UCRL-86160-Rev.1, CONF-811113-48-Rev.1
Contract W-7405-ENG-48
American Vacuum Society national symposium, Anaheim, CA, USA, 3 Nov 1981.
Best available copy from document source. Available in microfiche only.

Fabrication of Inertial Confinement Fusion (ICF) targets requires deposition of various types of coatings on microspheres. The mechanical strength, and surface finish of the coatings are of concern in ICF experiments. The tensile strength of coatings can be controlled through grain refinement, selective doping and alloy formation. We have constructed a magnetron cosputtering system to produce variable density profile coatings with high tensile strength on microspheres. The preliminary data on the properties of a Au-Cu binary alloy system by SEM and STEM analysis is presented. (ERA citation 07:042665)

DE82012290 PC **A03**/MF **A01**
Columbia Univ., New York. School of Engineering and Applied Science.
CO Sub 2 Laser Refraction and Scattering in Torus II.
M. Machida, D. Oepts, and G. A. Navratil. 1981, 31p DOE/ET/53016-76, CONF-811028-11
Contract AS02-76ET53016
23. annual meeting of the division of plasma physics of the APS, New York, NY, USA, 12 Oct 1981.
Microfiche only after original copies are exhausted.

A review is given of the Torus II operating parameters and the CO sub 2 scattering apparatus. Subsequent sections address the questions of beam deflection, phase shift of the transmitted beam, and scattering measurements made on the time scale of the Torus II plasma lifetime. (ERA citation 07:045253)

DE82012361 PC **A03**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Accelerator and Fusion Research Division.
D. L. Judd. Jan 82, 36p LBL-14038
Contract W-7405-ENG-48

Transverse and longitudinal phase volumes are evaluated and dilution factors defined. A new and simpler expression for the effect of third-order geometric aberrations is given. Constraints on the final quadrupole bore radius are discussed. Parameters of the example design are given and the preceding analysis is applied to it. The available dilution factor allows a comparison between the present induction linac example design and the rf linac designs available in 1978. The last sections contain a discussion of phase-space limitation on attaining high power density for spot heating experiments, and a brief discussion and summary. (ERA citation 07:045350)

DE82012388 MF **A01**
Lawrence Livermore National Lab., CA.
Stability and Disturbance of Large DC Superconducting Magnets.
S. T. Wang. 1981, 15p UCRL-86890-Rev.1
Contract W-7405-ENG-48
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

This paper addresses the stability aspects of several successful dc superconducting magnets such as large bubble chamber magnets, and magnets for the Mirror Fusion Test Facility and MHD Research Facility. Specifically, it will cover Argonne National Laboratory 12-Foot Bubble Chamber magnets, the 15-foot Bubble Chamber magnets at Fermi National Laboratory, the MFTF-B Magnet System at Lawrence Livermore National Laboratory, the U-25B Bypass MHD Magnet, and the CFFF Superconducting MHD magnet built by Argonne National Laboratory. All of these magnets are cooled in pool-boiling mode. Magnet design is briefly reviewed. Discussed in detail are the adopted stability criteria, analyses of stability and disturbance, stability simulation, and the final results of magnet performance and the observed coil disturbances. (ERA citation 07:045381)

DE82012408 PC **A02**/MF **A01**
General Atomic Co., San Diego, CA.
Development of a Prestressed Epoxy-Glass Cylinder for Preloading the Doublet III B-Coil Centerpost.
E. E. Reis. Feb 82, 6p GA-A-14599, CONF-811040-170
Contract AT03-76ET51011
Symposium on engineering problems of fusion research, Chicago, IL, USA, 26 Oct 1981, Portions of document are illegible.

The toroidal field coil (B-coil) of the Doublet III tokamak consists of 144 turns grouped in 24 bundles of six turns each. The bundles are collectively bonded together near the toroid centerline to form a composite centerpost. The bonded centerpost provides torsional rigidity for the B-coil to resist the lateral loads imposed by the interaction of the poloidal field with the current in the B-coil. The lateral forces are in opposite directions on the upper and lower halves of the coil and are completely reversed during operation of the machine. The summation of these lateral loads over the bonded centerpost results in pure torsional loading distributed over its length. The bonded centerpost provides an effective structure for internally resisting the torsional loads and much of the lateral loads on the outer sections of the coil. (ERA citation 07:045329)

DE82012412 PC **A02**/MF **A01**
General Atomic Co., San Diego, CA.
Doublet III Vessel-Wall Protection for 7-MW Neutral-Beam-Heated Plasma Operation.
T. E. McKelvey, and E. R. Johnson. Feb 82, 7p GA-A-16515, CONF-811040-172
Contract AT03-76ET51011
Symposium on engineering problems of fusion research, Chicago, IL, USA, 26 Oct 1981, Portions of document are illegible.

Doublet III vessel wall protection has been upgraded for the addition of neutral beam heating. The design of this protection system is described here in detail. (ERA citation 07:045333)

DE82012431 PC **A08**/MF **A01**
Lawrence Livermore National Lab., CA.
Negative-Potential Operation of TMX-Upgrade.
P. Poulsen, S. L. Allen, and D. E. Baldwin. 6 Apr 82, 165p UCID-19341

Contract W-7405-ENG-48
Portions of document are illegible.
Microfiche only after original copies are exhausted.

A tandem-mirror configuration can be created by combining hot electron end-cell plasmas with neutral-beam pumping. A region of large negative potential formed in each end cell confines electrons in the central cell. The requirement of charge neutrality causes the central-cell potential to become negative with respect to ground in order to equate ion loss to electron loss. Start-up and formation of the axial potential distribution, neutral-beam pumping, hot electron feed, electron-cyclotron-resonance heating (ECRH) power requirements, and stability are discussed in general terms. Each of these considerations impose constraints on the operation of TMX as a negative machine. The start-up requirements and scenario are also presented. Work on the design and analysis of negative tandems is continuing. The status of work to date is presented here with problem areas for future work identified. (ERA citation 07:045371)

DE82012573 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge.
Observation of the Parametric Decay Instability During Electron Cyclotron Resonance Heating on the Versator II Tokamak.
F. S. McDermott, G. Bekefi, and M. Porkolab. Mar 82, 22p DOE/ET/51013-37, PFC/RR-82-9
Contract AC02-78ET51013

Observations are reported on a nonlinear, three wave interaction process occurring during high power electron cyclotron heating in the Versator II tokamak. The measured spectra and the threshold power are consistent with a model in which the incident power in the extraordinary mode of polarization decays at the upper-hybrid resonance layer into a lower-hybrid wave and an electron Bernstein wave. (ERA citation 07:045249)

DE82012579 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Generic Problems with Li sub 2 O Breeders and Tritium Control in High-Temperature Fusion Reactors.
R. G. Hickman. 1 Apr 82, 18p UCID-19353
Contract W-7405-ENG-48

Within the past year, major reactor design studies have been performed using Li sub 2 O as a breeder material. These are the INTOR and STARFIRE/DEMO projects. We in our studies on fusion/synfuels are embarking on another, but our blanket will operate at significantly higher temperatures than these two. Some of the problems inherent in using this material are aggravated and some are diminished by operating at higher temperatures. For the conditions of the above two design studies many of the problems were mentioned in the respective references. This report reviews the available data, the educated guesses about unavailable data, and the design options that have been and are being chosen. The review of this information is a needed part for our proposed use of Li sub 2 O as a breeder in a fusion/synfuel reactor blanket. Further details will be available in various appropriate sections of our FY82 project report. (ERA citation 07:045372)

DE82012581 PC **A04**/MF **A01**
Department of Energy, Washington, DC.
Drift Resistive Interchange and Tearing Modes in Cylindrical Geometry.
J. M. Finn, W. M. Manheimer, and T. M. Antonsen, Jr. 13 Apr 82, 52p NRL-MR-4783

Resistive interchange and tearing modes are studied including the effects of electron parrallel pressure gradient and ion polarization drift (Hall terms) as well as finite plasma compressibility and perpendicular resistivity. It is found that for unfavorable curvature and weak tearing forces (positive but small delta ') all modes are stabilized provided the effects of the Hall (drift) terms are large enough. The principal stabilizing influences are plasma compression and coupling to outgoing drift waves. The relevance to reversed field pinch and spheromak experiments is discussed. (ERA citation 07:045292)

DE82012737 MF **A01**
Lawrence Livermore National Lab., CA.
Layered-Disk Transport Experiments at 1.064 mu M and 0.355 mu M.
E. M. Campbell, W. C. Mead, and R. E. Turner. 1981, 21p UCRL-86419, CONF-811028-12
Contract W-7405-ENG-48
23. annual meeting of the division of plasma physics of the APS, New York, NY, USA, 12 Oct 1981, Portions of document are illegible.
Available in microfiche only.

The results of electron transport experiments conducted at 1.064 mu m and 0.355 mu m with the Argus Laser will be presented. The experiments were conducted at a fixed absorbed intensity and pulse width of approximately 1-2x10 exp 14 W/cm exp 2 and 600 psec (FWHM) respectively. Energy on target ranged from 30 to 90 joules. To explore axial transport a variable thickness beryllium layer is coated onto an aluminum substrate. The effectiveness of electron heat conduction is studied by measuring the fall-off in aluminum x-ray yield (line and continuum) as the beryllium thickness is increased. In addition to the axial transport studies, lateral conduction is examined by placing the axial transport target onto a titanium disk. (ERA citation 07:045379)

DE82012759 PC **A03**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Determination of the Time Evolution of the Electron-Temperature Profile of Reactor-Like Plasmas from the Measurement of Blackbody Electron-Cyclotron Emission.
P. C. Efthimion, V. Arunasalam, R. A. Bitzer, and J. C. Hosea. Apr 82, 45p PPPL-1888
Contract AC02-76CH03073

Plasma characteristics (i.e., n/sub e/ greater than or equal to 1 x 10 exp 13 cm exp -3 , T/sub e/ greater than or equal to 10 exp 7 exp 0 K, B/sub psi/ greater than or equal to 20 kG) in present and future magnetically confined plasma devices, e.g., Princeton Large Torus (PLT) and Tokamak Fusion Test Reactor (TFTR), meet the conditions for blackbody emission near the electron cyclotron frequency and at few harmonics. These conditions, derived from the hot plasma dielectric tensor, have been verified by propagation experiments on PLT and the Princeton Model-C Stellarator. Blackbody emission near the fundamental electron cyclotron frequency and the second harmonic have been observed in PLT and is routinely measured to ascertain the time evolution of the electron temperature profile. These measurements are especially valuable in the study of auxiliary heating of tokamak plasma. Measurement and calibration techniques will also be discussed with special emphasis on our fast-scanning heterodyne receiver concept. (ERA citation 07:045302)

DE82012808 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Wavelength Scaling of Implosion Symmetry, Ablation Pressure, and Hydrodynamic Efficiency in Laser Fusion.
C. E. Max, J. D. Lindl, and W. C. Mead. 31 Jul 81, 24p UCRL-86516, CONF-810576-4
Contract W-7405-ENG-48
Topical conference on symmetry aspects of inertial fusion implosions, Washington, DC, USA, 27 May 1981.

We examine the scaling of implosion symmetry, ablation pressure, and hydrodynamic efficiency with the wavelength of the laser, using a recent theoretical analysis of ablative laser driven implosions as a tool. Symmetrization by a hot atmosphere is most effective for long wavelength lasers, whereas ablation pressure and hydrodynamic efficiency are best for shorter laser wavelengths. (ERA citation 07:045380)

DE82013373 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Unconventional Heating Experiments in EBT.
J. C. Glowienka, W. A. Davis, D. L. Hillis, T. Uckan, and F. M. Bieniosek. Apr 82, 29p ORNL/TM-8180
Contract W-7405-ENG-26

Reported here are the results of two nonstandard heating experiments. In one, the fundamental ECH resonance at either 10.6 or 18 GHz was placed at the usual ring position in an attempt to generate rings solely with fundamental heating; this is the fundamental resonance configuration (FR). In a second experiment, an attempt was made to heat the ring and core separately by forming the ring as above with 10.6 GHz and then heating the core with the fundamental and second harmonic of 28 GHz; this is the separately coupled ring and toroidal core heating configuration (SCRATCH). In both cases, the hot electron annuli were formed and stabilized the core plasma as in the SR experiments. In FR, the rings form at the second harmonic and no significant potential structures were found. In SCRATCH, either a potential well or a potential hill could be formed. In both heating regimes, significant ion heating above that found in standard heating experiments was found. (ERA citation 07:045294)

DE82701187 PC **A02**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Anomalous Deceleration of Light Ion Beam in Plasma of Inertial Confinement Fusion.
T. Abe, and K. Niu. Sep 80, 16p IPPJ-479
U.S. Sales Only.

The ion beam propagation in inertial confinement fusion by light ion beam is analyzed. The anomalous deceleration of the beam ion occurs, when the beam including the electron interacts with the background plasma with a comparable number density. This deceleration is caused by the two stream instability between the beam and the background plasma electrons and then becomes maximum when each density is equivalent. The anomalous deceleration rate of the beam ion is computed by using the quasilinear theory. It is shown that the anomalous deceleration which the beam ion (10 exp 17 cm exp -3) accepts from the background plasma (10 exp 18 cm exp -3) is equivalent to the classical one from the background plasma with solid density (10 exp 21 cm exp -3). (Atomindex citation 13:657895)

DE82701188 MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Magnetically Insulated Transmission Line Used for Relativistic Electron Beam Injection into SPAC-VI.
T. Tsuzuki, K. Narihara, Y. Tomita, and A. Mohri. Oct 80, 12p IPPJ-DT-80
In Japanese.
U.S. Sales Only. Available in microfiche only.

For the purpose to inject the electron beam with energy of about 1.5 MeV and current of about 100 kA into the SPAC-6 (torus device), a magnetically insulated transmission line was designed and constructed. The motion of electrons in the line was theoretically analyzed. The requirements for the design of the transmission line were as follows: (a) condition of magnetic insulation, (b) suppression against reverse gas flow from the beam source to the torus, (c) care to minimize the influence of strong torus magnetic field, (d) reduction of inductance, and (e) safety engineering measures, e.g., separation valve in the MITL between the beam source and the SPAC-6. The transmission line of 2.4 m long was designed and constructed. The wave forms of electric potential and current were measured. The transmission efficiency of current along the axis and the efficiency as a function of current at the end of the line were also measured. The reason of the loss of current is discussed. (Atomindex citation 13:657896)

DE82701190 PC **A02**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Structural Design Study of Tritium Breeding Blanket with a Lead Layer as a Neutron Multiplier.
H. Iida, K. Kitamura, A. Minato, H. Sakamoto, and T. Yamamoto. Dec 80, 19p JAERI-M-9250
U.S. Sales Only.

Thermal and structural design study of a tritium breeding blanket with a lead layer for a International Tokamak Reactor (INTOR) is carried out. Tube in shell type blanket with a lead layer is found to be promising. The volume fraction of structural material in the lead layer can be small enough to keep the neutron multiplication effect of lead. Reasonable value of shell effect is attainable due to lead layer in the front part of the blanket. (Atomindex citation 13:657898)

DE82701191 MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Annual Report of the Fusion Research and Development Center for the Period of April 1, 1979 to March 31, 1980.
Mar 81, 329p JAERI-M-9421
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

Research and development activities of the Fusion Research and Development Center (Division of Thermonuclear Fusion Research and Division of Large Tokamak Development) from April 1979 to March 1980 are described. In Plasma physics research two experiments both related to radio-frequency power injection into tokamak plasmas are to be noted. One is the dem-

onstration of current drive by lower hybrid waves in JFT-2 and the other high efficiency ICRF heating at two-ion hybrid resonance in JFT-2a/DIVA. A multi-MW neutral beam injection system was installed and tested at JFT-2 with heating experiments expected to start shortly. JFT-2a/DIVA was shutdown to make space for the injector. A new ingredient in this area is the initiation of dee plasma experiments in Doublet III at San Diego, USA by JAERI team under US-Japan cooperation agreement. Progress was rapid achieving all experimental objective planned for this period. Construction of JT-60 is in progress as planned. A Mukoyama site where JT-60 and other new facilities will be located was procured in October 1979, which was followed by the construction starts of JT-60 buildings. The completion of JT-60 is expected in fall 1984. The progressive brief summaries are presented in following topics; development of neutral beam and radiofrequency heating system for JT-60, installation of the cluster testing facility with NbTi. (Atomindex citation 13:657899)

DE82701193 PC **A02**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Ballooning Stable High beta Tokamak Equilibria.
T. Tuda, M. Azumi, G. Kurita, T. Takizuka, and T. Takeda. Apr 81, 13p JAERI-M-9472
U.S. Sales Only.

The second stable regime of ballooning modes is numerically studied by using the two-dimensional tokamak transport code with the ballooning stability code. Using the simple FCT heating scheme, we find that the plasma can locally enter this second stable regime. And we obtained equilibria with fairly high beta (beta - 23%) stable against ballooning modes in a whole plasma region, by taking into account of finite thermal diffusion due to unstable ballooning modes. These results show that a tokamak fusion reactor can operate in a high beta state, which is economically favorable. (Atomindex citation 13:657901)

DE82701194 PC **A02**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Energy Confinement of Ohmically Heated D-Shaped Plasma in Doublet III. Doublet-III Experimental Report, 8.
M. Nagami, H. Yokomizo, and M. Shimada. May 81, 25p JAERI-M-9509
U.S. Sales Only.

Energy confinement properties were compared for D-shaped and circular cross section plasmas with an identical horizontal minor radius as functions of plasma current, electron density, and vertical elongation under a wide range of discharge conditions. The improvement of the energy confinement time with vertical elongation can be explained with an electron energy transport determined by anti n/sub e/q* and approximately neoclassical ion energy transport, both include the geometrical effect of vertical elongation. Particularly high current operation capability of D-shaped plasma produces remarkable improvement of energy confinement at high density region due to the reduction of neoclassical heat loss of ions. The highest energy confinement time (75 msec) is realized for a high current and high density D-shaped discharge. (Atomindex citation 13:657902)

DE82780452 PC **A06**/MF **A01**
Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Reaktorentwicklung.
Neutronic Investigations on the Application of Lithium Aluminates in the Tritium Breeding Blanket of Future Fusion Reactors. Attempts at Verifying Theoretical Predictions by Means of Special Measuring Methods.
A. Mohsin. Feb 81, 118p Juel-1705
In German.Thesis.
U.S. Sales Only.

A survey is given about the state of development work at the blanket. It shows that present designs aim at a fusion reactor with low tritium inventory. This aim can be achieved with a solid blanket. In this paper this concept is described and the selection of appropriate materials for the solid blanket is discussed. The lithium aluminates turned out to be the most suitable materials. Comparing the different lithium aluminates the compounds Li sub 5 AlO sub 4 and LiAlO sub 2 proved to be the most favourable. The improvement of the breeding ratio when using lead as neutron multiplier was investigated. Employing, for example, a lead zone of 15 cm thickness in front of a 60 cm thick breeding zone, the tritium breeding ratio is raised to 1.65 for Li sub 5 Al sub 4 and to 1.48 for LiAlO sub 2 -. The originally higher breeding ratio of the Li sub 5 AlO sub 4 in contrary to the LiAlO sub 2 is compensated hereby. By this LiAlO sub 2 becomes a very interesting material for a solid blanket since it furthermore exhibits a higher melting point and higher phase transition temperature. For experimental check of the nuclear data of this material and the computational techniques used, a test model was designed and built. This blanket model was used for measuring the space-dependent tritium production rate, which could be compared to corresponding computations. The assembly was made of a lead zone as neutron multiplier, LiAlO sub 2 as breeding material, and polyethylene as neutron reflector. (ERA citation 07:045345)

DE82903140 MF **A01**
Aluminum Co. of America, Alcoa Center, PA. Alcoa Technical Center.
Low-Activation Structural Materials for Fusion Reactors: Extreme-Purity Base Aluminum Alloys. Final Report.
R. A. Kramer, E. C. Franz, R. H. Wagner, R. R. Guerra, and S. P. Ray. Feb 82, 132p EPRI-AP-2220
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

In this study a number of extreme purity base-ingot metallurgy (EPB-I/M) and powder metallurgy (P/M) alloys were fabricated. Their mechanical properties, metallurgical structure and high temperature water corrosion susceptibility were evaluated. In addition the concepts that hydrogen and helium gases generated during CTR operation will diffuse out of the structure were investigated. Mechanical properties of extreme purity base alloys were demonstrated to be only slightly below those of comparable commercial alloys of the 4000, 5000, and 6000 series. Metallurgical structures of the alloys were judged satisfactory. An EPB-I/M alloy (A1-3 Si-.05V) was found which resisted water corrosion at 254 exp 0 C. Some of the alloys were supplied to Atomics International for radiation damage testing. Experients and calculations confirmed that, indeed, hydrogen and helium generated in fusion reactor operation at 400 exp 0 C will achieve a low steady-state concentration by outward diffusion. Hydrogen achieves this by ordinary diffusion processes, and helium is shown to move by bubble diffusion in a temperature gradient. (ERA citation 07:045327)

N82-28180/9 PC **A03**/MF **A01**
Stichting voor Fundamenteel Onderzoek der Materie, Rijnhuizen (Netherlands). Inst. voor Plasma-Fysica.
Equilibrium and Stability Aspects of a Screw-Pinch Based on the Sharp-Boundary Model of a High-beta Tokamak.
J. Rem. Feb 81, 43p DE81-700758, RIJNHUIZEN-81-130
Prepared in Cooperation with Stichting voor Fundamenteel Onderzoek der Materie, Jutphaas.

The sharp boundary model of a high beta tokamak surrounded by force free currents (FFC) which describes the magnetohydroynamic stability of a screw pinch: a Tokamak with unfiorm q-profile is discussed. The relationship between the equilibrium parameters which gives rise to a q-profile in the FFC region the poloial field outside the plasma must be determined. An approximation is made that leads to the relationship. The stability of a screw pinch with a number of different cross-sections is analyzed.

18B. Isotopes

DE82701478 MF **A01**
UKAEA Atomic Energy Research Establishment, Harwell (England). Chemistry Div.
Computer Program for gamma Ray Identification Using the Westmeier Data.
H. E. Sims. Oct 81, 14p AERE-R-10340
U.S. Sales Only. Available in microfiche only.

Probably the most complete compilation of gamma - rays (> 35,000) is that of Reus and Westmeier. Parts I and II of their catalogue are now available on the Harwell IBM computer. This report describes a simple search routine for preliminary radionuclide identification using an input list of gamma -ray energies provided by the peak fitting routine GAMANAL. (Atomindex citation 13:660980)

18C. Nuclear Explosions

AD-A117 482/0 PC **A02**/MF **A01**
Ballistic Research Labs., Aberdeen Proving Ground, MD.
Analytical and Experimental Studies of the Response of a Cylinder to Nuclear Thermal/Blast Loads.
Conference paper,
Frederick H. Gregory, and Richard J. Pearson. 18 Jun 82, 15p
Paper from the Proceedings of the Army Sciences Conference (1982), 15-18 Jun 82.

Two phenomena which are emitted from a nuclear weapon, whose target vulnerability ranges often overlap, are thermal radiation and blast waves. In most situations of interest to the Army, targets are exposed to a high percentage of the total available thermal pulse prior to blast wave arrival. This sequence of loads is detrimental to the survival of light weight structures in which significant in-depth heating occurs prior to the blast wave envelopment. There has been evidence that this thermal preheating causes enhanced structural damage (1,2). (Author)

AD-A117 574/4 PC **A23**/MF **A01**
Kaman Tempo, Santa Barbara, CA.
CASTLE Series, 1954.
Technical rept.,
Edwin J. Martin, and Richard H. Rowland. 1 Apr 82, 530p KT-81-0026(R), DNA-6035F, SBI-AD-E301 010
Contract DNA001-79-C-0472

CASTLE was an atmospheric nuclear weapons test series held in the Marshall Islands at Enewetak and Bikini atolls in 1954. This is a report of DOD peronnel in CASTLE with an emphasis on operations and radiological safety.

AD-A117 625/4 PC **A06**/MF **A01**
SRI International, Menlo Park, CA.
Experimental Extinguishment of Fires by Blast.
Final rept.,
Jana Backovsky, Stanley B. Martin, and Robert McKee. May 82, 104p
Contract EMW-C-0559

Experiments on extinction of fires by airblast were continued in the shocktube facility dedicated to blast/fire interactions studies, and the facility was further improved toward a full, thermal/blast simulation capability, which will include a thermal radiation source. The experimental efforts were aimed toward improving our understanding of the physical mechanisms and scaling rules of blast extinguishment of fires through (1) tests with various common liquid (class B) fuels of different physicochemical properties and burning behavior and (2) tests with wood cribs of various element (stick) thicknesses and consequently varying burning behavior and time scales. Limited shocktube tests were also conducted in preparation for the MILL RACE event featuring blast extinction of fires on cellulosic debris. (Author)

DE82009408 MF **A01**
Lawrence Livermore National Lab., CA.
Application of the Implicit TENSOR Code to Studies of Containment of Undergound Nuclear Tests.
D. E. Burton, J. B. Bryan, L. A. Lettis, Jr., and J. T. Rambo. Feb 82, 36p UCRL-87296, CONF-8109126-1
Contract W-7405-ENG-48
Monterey containment symposium, Monterey, CA, USA, 1 Sep 1981.
Best available copy from document source. Available in microfiche only.

The TENSOR code, a two-dimensional finite-difference code, has been used extensively for the solution of stress wave propagation problems in materials, particularly those associated with the containment of underground nuclear test. These problems are typically characterized by shock waves at early times and by nearly incompressible flow at later times. To address this type of problem more economically, an implicit Newmark time integration has been implemented. Implicit differencing requires the solution of a coupled system of equations, by either direct or interative methods. An iterative technique has been selected to reduce the impact of the algorithm on the code structure and because it is the more economical method when only modest increases in timestep are desired. Although the algorithm is similar in some respects to

the ICE method of Harlow and Amsden, substantial differences are required by the involvement of a complete stress tensor (instead of a scalar pressure) and by the highly nonlinear nature of the earth material constitutive relations.

DE82011981 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Acoustic Disturbance at Ionospheric Heights Caused by the MILL RACE Explosion.
D. G. Rickel, and D. J. Simons. 1982, 25p LA-UR-82-618, CONF-820313-3
Contract W-7405-ENG-36
DNA-Millrace symposium, Adelphi, MD, USA, 16 Mar 1982.

The principal objective of the Los Alamos National Laboratory in the MILL RACE experiment was to measure the over-head ionospheric response due to the MILL RACE explosion. Such a measurement enables one to test computer models designed to quantitatively predict ionospheric disturbances caused by known sources. The emphasis of the models has been directed at calculating effects on rf propagation associated with the predicted ionospheric disturbances. Consequently vertical incidence phase sounding measurements of a well-characterized source provide a direct and sensitive test of the computer models and, for this reason, a vertical incidence phase sounder was located 3300 meters to the west of the MILL RACE ground zero. Another area of interest is the development of an understanding of the atmospheric response to known sources at distances where the acoustic response no longer dominates. Such an undertaking requires measurements at these remote points. Deployment of a bistatic sounding network enabled the investigation of this area of interest. Results are reported. (ERA citation 07:044884)

18D. Nuclear Instrumentation

DE82008125 MF **A01**
Los Alamos National Lab., NM.
Spectrometer Detectors.
C. L. Morris. 1981, 18p LA-UR-82-340, CONF-8109123-1
Contract W-7405-ENG-36
Workshop on high-resolution, large-acceptance spectrometers, Argonne, IL, USA, 8 Sep 1981, Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

Comparisons of different techniques for position measurements in spectrometer focal plane detector systems are made. Capabilities and limits of gas proportional detectors are discussed. (ERA citation 07:051352)

DE82009305 PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Computer Controlled Scanning Systems for Quantitative Track Measurements.
R. Gold, J. H. Roberts, C. C. Preston, and F. H. Ruddy. 21 Mar 82, 12p HEDL-SA-2379-FP, CONF-820321-13
Contract AC06-76FF02170
ASTM-EURATOM symposium on reactor dosimetry, Gaithersburg, MD, USA, 22 Mar 1982.

The status of three computer controlled systems for quantitative track measurements is described. Two systems, an automated optical track scanner (AOTS) and an automated scanning electron microscope (ASEM) are used for scanning solid state track recorders (SSTR). The third system, the emulsion scanning processor (ESP), is an interactive system used to measure the length of proton tracks in nuclear research emulsions (NRE). Recent advances achieved with these systems are presented, with emphasis placed upon the current limitation of these systems for reactor neutron dosimetry.

DE82010678 MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Field Measurements and Interpretation of TMI-2 Instrumentation: HP-R-213.
J. E. Jones, J. T. Smith, and M. V. Mathis. Jan 82, 64p GEND-INF-017(V.9)
Contract AC07-76ID01570
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

This report provides the information gathered by TEC on the area radiation monitor HP-R-213. This detector was located at 347 feet elevation inside containment. This instrument consisted of a Victoreen Model 857-2 detector assembly connected to a Victoreen Model 856-2 panel alarm and approximately 330 feet of interconnecting cable. This instrument was believed to have failed due to a constant off-scale low radiation level indication and due to a lack of response to the manually activated checksource in the detector. As a result of this failure, the detector was a candidate for early replacement to provide long-term radiation monitoring capability inside containment. (ERA citation 07:050174)

DE82011057 MF **A01**
Lawrence Livermore National Lab., CA.
Miniature Proportional Counter for Compression Measurements of Laser-Fusion Targets.
S. M. Lane, J. H. Dellis, C. K. Bennett, and E. M. Campbell. Oct 81, 4p UCRL-86030, CONF-811012-57
Contract W-7405-ENG-48
IEEE symposium on nuclear science, San Francisco, CA, USA, 21 Oct 1981, Portions of document are illegible.
Available in microfiche only.

Direct drive laser fusion targets consisting of DT gas encapsulated in glass microshells produce 14.1 MeV neutrons that can interact with silicon-28 nuclei in the glass to produce a 2.2 minute aluminum-28 activity. From the number of exp 28 Al nuclei created and the neutron yield, the compressed glass areal density can be found. To determine the number of activated atoms created, we collect approximately one-half of the target debris on a thin metal foil which is transferred to our beta-gamma coincidence detector. This detector consists of a 25 cm x 25 cm NaI(Tl) crystal having a 5 cm x 15 cm well. We have recently built a miniature proportional counter that fits into this well and is used to detect beta particles. It is constructed of .025 cm thick copper and has nine separate chambers through which methane flows. The coincidence background is 0.14 cpm and the measured beta efficiency is 45%. We are now building a .0125 cm thick counter made of aluminum having a predicted efficiency of $> 90\%$. (ERA citation 07:048856)

DE82012146 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Cerenkov Radiators for Photodiodes.
J. W. Toevs, C. S. Young, P. A. Zagarino, and R. D. Seno. 1982, 11p LA-UR-82-833, CONF-820334-3
Contract W-7405-ENG-36
Defense Nuclear Agency conference on instrumentation for nuclear weapons effects, White Oak, MO, USA, 30 Mar 1982.

Several materials have been examined for use as Cerenkov converters in front of photodiodes in an effort to find a gamma detector system that has more sensitivity than a Compton detector but makes little sacrifice in bandwidth. Suprasil (fused silica) and UVT Lucite (acrylic) were 10-100 times more sensitive than a Compton detector and provided almost the same bandwidth. Barium fluoride provided almost 1000 times the sensitivity, but with a factor of 3 or 4 reduction in bandwidth. Relative sensitivities are strongly dependent on beam composition; the Cerenkov package is less sensitive to a pure gamma -ray beam than to a gamma -electron shower beam. Hence, beam composition must be considered in any application of these detectors. (ERA citation 07:044562)

18E. Nuclear Power Plants

DE82009937 PC **A09**/MF **A01**
Sandia National Labs., Albuquerque, NM.
BWR Graphics Display System Dynamic Screening Program. Final Report.
D. W. Buckley, P. R. Lobner, E. Hope, and G. Roy. Feb 82, 185p ALO-1003, SAI-01381-364LJ
Contract AC04-76DP00789
Portions of this report are illegible.
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As part of a program to evaluate the benefits and optimal design features for a BWR control room graphic display system, a Dynamic Screening Program was initiated to select a set of displays to be evaluated under realistic operating conditions at a BWR simulator. The dynamic screening of the displays was conducted using second-by-second data of transients run on a BWR simulator. The displays were dynamically driven in a real-time mode with the transient data and displayed on a high resolution color CRT monitor. The program considered three alternate display sets, A, B, and C, each having three levels of displays. The third level of each display set was identical, containing nine parameter versus parameter and information graphs relevant to BWR Emergency Procedure Guidelines (EPGs). Display set A contained horizontal bar graphs and numerical values. Display set B contained a top level iconic display and second level time-history plots. Display set C contained a reactor pressure vessel (RPV) mimic and vertical bar graphs. The results of the program were compiled and a set of displays for use at a BWR simulator have been recommended. (ERA citation 07:043543)

NUREG-0390-V6-N1 PC **A10**/MF **A01**
Nuclear Regulatory Commission, Washington, DC.
Topical Report Review Status.
Bi-annual rept. 20 Jan-15 Jul 82.
15 Jul 82, 209p
See also NUREG-0390-V5-N1.

The primary purpose of this document is to provide periodic progress reports of on-going topical report reviews, to identify those topical reports for which the Nuclear Regulatory Commission (NRC) staff review has been completed and, to the extent practicable, to provide NRC management with sufficient information regarding the conduct of the topical report program to permit taking whatever actions deemed necessary or appropriate.

NUREG-0537-F PC **A18**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
Final Environmental Statement Related to the Operation of Midland Plant, Units 1 and 2, Docket Nos. 50-329 and 50-330, Consumers Power Company.
Jul 82, 410p

The final environmental statement contains the second assessment of the environmental impact associated with operation of the Midland Plant, Units 1 and 2 pursuant to the National Environmental Policy Act of 1969 (NEPA) and 10 CFR Part 51, as amended, of the NRC's regulations. This statement examines: the purpose and need for the Midland project, alternatives to the project, the affected environment, environmental consequences and mitigating actions, and environmental and economic benefits and costs.

NUREG-0748-V2-N6 PC **A16**/MF **A01**
Nuclear Regulatory Commission, Washington, DC.
Operating Reactors Licensing Actions Summary.
Licensing action summary 1-30 Jun 82.
Jul 82, 352p
See also NUREG-0748-V2-N5.

The Operating Reactors Licensing Actions Summary is designed to provide the management of the Nuclear Regulatory Commission (NRC) with an overview of licensing actions dealing with operating power and non-power reactors.

NUREG-0936-V1-N2 PC **A09**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Administration.
NRC Regulatory Agenda, Quarterly Report April-June 1982.
Jul 82, 196p

The NRC Regulatory Agenda is a compilation of all rules on which the NRC has proposed or is considering action and all petitions for rulemaking which have been received by the Commission and are pending disposition by the Commission. The Regulatory Agenda is updated and issued each quarter. The Agendas for April and October are published in its entirety in the Federal Register while a notice of availability is published in the Federal Register for the January and July Agendas.

18F. Radiation Shielding and Protection

DE82009879 PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Development of Enriched Boron Track-Etch Converter Screens for Neutron Radiographic Applications.
R. L. Tomlinson, and J. E. Tobin. Nov 81, 9p HEDL-SA-2404-FP, CONF-811215-8
Contract AC06-76FF02170
World conference on neutron radiography, San Diego, CA, USA, 7 Dec 1981, Portions of document are illegible.

The Neutron Radiography Facility (NRF) located at the US Department of Energy (DOE) Hanford site near Richland, Washington was used to evaluate a series of natural and enriched boron compounds for potential use as track-etch neutron radiographic converter screens. Materials were evaluated for various parameters; e.g., resolution, uniformity, exposure time, radiation damage (gamma radiation) and physical durability. The boron screens are to be used with commercially-available cellulose nitrate sheets to produce high-resolution track-etch neutron radiographs of irradiated fast reactor fuel. Sice the gamma-ray exposure from the irradiated fuel is high during neutron radiography, radiation damage tests were performed on the screens using the cobalt-60 irradiation facility operated by the Hanford Engineering Development Laboratory (HEDL) to evaluate the screen durability. Interest centered upon the highly-enriched boron compounds so that the required exposure time for the neutron radiographs could be minimized.

DE82011979 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Extracting Maximal Information on Positive Muon Diffusion in Metals.
M. Leon. 1982, 6p LA-UR-82-603, CONF-820325-5
Contract W-7405-ENG-36
International symposium on the electronic structure and properties of hydrogen in metals, Richmond, VA, USA, 4 Mar 1982, Portions of document are illegible.

It is discussed how combining zero- and longitudinal-field mu SR can give more information on the motion of the mu exp + in the target than zero-field studies alone. (ERA citation 07:048622)

DE82011983 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Fast Algorithm for Two-Dimensional Data Table Use in Hydrodynamic and Radiative-Transfer Codes.
W. L. Slattery, and W. H. Spangenberg. 1982, 16p LA-UR-82-656, CONF-820433-1
Contract W-7405-ENG-36
Science, engineering and the Cray-1 symposium, Minneapolis, MN, USA, 5 Apr 1982.

A fast algorithm for finding interpolated atomic data in irregular two-dimensional tables with differing materials is described. The algorithm is tested in a hydrodynamic/radiative transfer code and shown to be of comparable speed to interpolation in regularly spaced tables, which require no table search. The concepts presented are expected to have application in any situation with irregular vector lengths. Also, the procedures that were rejected either because they were too slow or because they involved too much assembly coding are described. (ERA citation 07:045199)

DE82012132 PC **A03**/MF **A01**
Los Alamos National Lab., NM.
Dynamics of Radiating Fluids.
D. Mihalas, and R. Weaver. 1982, 34p LA-UR-82-743, CONF-820429-1
Contract W-7405-ENG-36
Los Alamos/CEA conference, Paris, France, 19 Apr 1982.

The purpose of this paper is to give an overview of the role of radiation in the transport of energy and momentum in a combined matter-radiation fluid. The transport equation for a moving radiating fluid is presented in both a fully Eulerian and a fully Lagrangian formulation, along with conservation equations describing the dynamics of the fluid. Special attention is paid to the problem of deriving equations that are mutually consistent in each frame, and between frames, to 0(v/c). A detailed analysis is made to show that in situations of broad interest, terms that are formally of 0(v/c) actually dominate the solution, demonstrating that it is essential (1) to pay scrupulous attention to the question of the frame dependence in formulating the equations, and (2) to solve the equations to 0(v/c) in quite general circumstances. These points are illustrated in the context of the nonequilibrium radiation diffusion limit, and a sketch of how the Lagrangian equations are to be solved is presented. (ERA citation 07:045201)

DE82701462 MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Obninsk. Fiziko-Energeticheskii Inst.
Fundamental Solution of an Integro-Differential Transport Equation.
B. D. Abramov. 1980, 18p FEI-1135
In Russian.
U.S. Sales Only. Available in microfiche only.

The problems connected with the construction of generalized functions of the fundamental solution of a stationary single-velocity integro-differential neutron transport equation on the basis of the integral transformation technique and its applications are analyzed. A number of concrete expressions for the fundamental solutions in the three-dimensional (spherical coordinates) and two-dimensional (cylindrical coordinates) geometries are derived. The most of the formula are apparently published for the first time. (Atomindex citation 13:660896)

DE82701463 MF **A01**
Erevanskii Fizicheskii Inst. (USSR).
Determination of a Linear Absorption Coefficient of Some Complex Substances.
M. A. Martirosyan, I. P. Karabekov, and D. L. Egikyan. 1978, 11p EFI-294(19)-78
In Russian.
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

The results of the measurement of linear absorption coefficients mu (lambda) of plexiglass (C sub 5 H sub 8 O sub 2), mylar (C sub 5 H sub 4 O sub 2), air and aluminium in the wavelength range lambda from 0.8 A to 2.6 A are given. The experiments are carried out at the synchrotrn radiation beam of the Erevan electron accelerator. The data obtained are compared with calculation values mu (lambda). It is shown that for mylar, plexiglass and aluminium there is a good coincidence of calculation and experimental values mu (lambda) in the studied wavelength range. (Atomindex citation 13:660899)

DE82701464 PC **A02**/MF **A01**
Erevanskii Fizicheskii Inst. (USSR).
Effect of Experimental Factors on Stability of Coherent Bremsstrahlung Spectrum.
R. O. Avakyan, S. S. Ovakimyan, and S. P. Taroyan. 1981, 24p EFI-459(1)-81
In Russian.
U.S. Sales Only.

The description is given of the theoretical results of coherent bremsstrahlung (CB) intensity and polarization spectra of high energy electrons on a diamond crystal with experimental factors taken into account. It is shown that the CB spectrum instability may be caused by the variation of electron mean inlet angle into crystal as well as of angular divergence of accelerated electrons in the ring. In the first case a notable transformation of intensity and polarization spectra is observed which can be used in experimental investigation of the reasons of CB spectra instability. (Atomindex citation 13:660900)

DE82780453 PC **A03**/MF **A01**
Physikalisch-Technische Bundesanstalt, Brunswick (Germany, F.R.).
MARS-TR 440: A Program to Calculate the Stopping Power, Ranges, Energy and Small-Angle Scattering of Ions in Matter.
H. J. Brede, and B. R. L. Siebert. Jul 80, 30p PTB-ND-19
In German.
U.S. Sales Only.

An existing code to calculate the stopping power and the ranges of heavy charged particles has been extended such that computations of straggling in energy and angle are possible. The corresponding theories have been described. Beyond some custom made routines for problems in neutron dosimetry a correction subroutine has been developed allowing to adapt the computed curves to experimental points. (ERA citation 07:045206)

PB82-254517 PC **E03**/MF **E03**
Commission of the European Communities, Luxembourg.
Study on Effect of Multiple Recycling of Plutonium on Problem Pertaining to Radiation Protection in a Mixed Oxide Fuel Fabrication Plant (Synthesis Report).
c1981, 33p EUR-7354-EN
Customers in the European Community countries should apply to the Office for Official Publications of the European Communities, B.P. 1003, Luxembourg.

The objectives of this study are: (1) to determine the radiation properties of various plutonium mixtures; (2) to identify the dependence of these properties on isotope compositions; and (3) to determine the possible effects of these parameters on handling and shielding plutonium in mixed oxide fuel fabrication plants. In the theoretical part, a calculation is made of the changes in activity of definite reference mixtures with a characteristic isotope composition, i.e. realistic isotope mixtures with relatively high shares of (238)Pu and (241)Pu, relevant to radiation protection. In the experimental part, radiation protection measurements were made of actually available plutonium mixtures which, as regards their isotope composition, closely approximate the mixtures used in the theoretical part. The results of the theoretical part and experimental measurement results are compared, and the conclusions drawn concerning radiation protection are stated.

18G. Radioactive Wastes and Fission Products

DE82008757 MF **A01**
National Conference of State Legislatures, Denver, CO.
Legislator's Guide to Low-Level Radioactive Waste Management.
J. M. Jordan, and L. G. Melson. May 81, 50p DOE/ID/12141-T1
Contract FG07-80ID12141
Portions of document are illegible.
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The purpose of the guide is to provide state legislators and their staff with information on low-level radioactive waste management, issues of special concern to the states, and policy options. During 1979, producers of low-level radioactive wastes (LLW) faced a crisis. Two of the three commercial disposal sites were temporarily closed and some LLW producers were running short on storage space. For hospitals, clinics, research organizations, and some industries, this meant potential curtailment of activities that produced these materials. Commercial nuclear reactors were not as hard hit during the crisis because they have larger storage areas. The two sites at Beatty, Nevada, and Hanford, Washington, reopened and the immediate crisis was averted. However, the longer term problem of shortage of disposal capacity was just beginning to be recognized. States should be concerned with this problem for several reasons. First, all states produce LLW although the volumes differ among states. Second, states have the responsibility to protect the public health and welfare of their citizens. Third, states may be given the authority to regulate LLW disposal if they enter into agreements with the federal government (Agreement States Program), and 26 states have that authority. Fourth, because of the long-term monitoring and surveillance necessary at a disposal site, states rather than private industry will be held responsible for ensuring that the disposal site is performing safely. Finally, Congress established a policy in 1980 that each state is responsible for the safe disposal of LLW generated within its borders. This policy also includes provisions that could lead to excluding states from using disposal facilities unless they have entered into regional agreements with other states. Two primary options exist for a state: developing its own disposal facility for LLW generated within its borders or joining with other states to develop a regional disposal facility. (ERA citation 07:042498)

DE82008765 PC **A04**/MF **A01**
Lawrence Livermore National Lab., CA.

Hazardous-Waste Analysis Plan for LLNL Operations.
R. S. Roberts. 12 Feb 82, 56p UCID-19322
Contract W-7405-ENG-48
Portions of this report are illegible.
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The Lawrence Livermore National Laboratory is involved in many facets of research ranging from nuclear weapons research to advanced Biomedical studies. Approximately 80% of all programs at LLNL generate hazardous waste in one form or another. Aside from producing waste from industrial type operations (oils, solvents, bottom sludges, etc.) many unique and toxic wastes are generated such as phosgene, dioxin (TCDD), radioactive wastes and high explosives. One key to any successful waste management program must address the following: proper identification of the waste, safe handling procedures and proper storage containers and areas. This section of the Waste Management Plan will address methodologies used for the Analysis of Hazardous Waste. In addition to the wastes defined in 40 CFR 261, LLNL and Site 300 also generate radioactive waste not specifically covered by RCRA. However, for completeness, the Waste Analysis Plan will address all hazardous waste.

DE82008846 MF **A01**
Oak Ridge National Lab., TN.
Framework for Evaluating the Utility of Incentive Systems for Radioactive Waste Repository Siting.
S. A. Carnes, E. J. Soderstrom, J. Sorensen, E. Peelle, and J. H. Reed. 1982, 14p CONF-820303-24
Contract W-7405-ENG-26
Waste management conference, Tucson, AZ, USA, 8 Mar 1982, Portions of document are illegible.
Available in microfiche only.

The importance of social and institutional issues in siting radioactive waste repositories has been recognized in recent years. Within this set of issues, the siting of repositories over the objections of members of potential host communities is viewed as especially problematic. Incentives to potential host communities have been suggested as a means of increasing local support for and offsetting local opposition to such facilities. Incentives are classified according to their function as mitigation, compensation or reward. Our analysis of results of a 1980 survey (conducted by John Kelly, Complex Systems Group, University of New Hampshire) of 420 rural Wisconsin residents indicates that incentives may achieve the purpose of increasing support for and decreasing opposition to accepting a repository. Criteria for evaluating the utility of incentives are identified. They respond to four basic questions: (1) What is absolutely necessary. (2) Will the incentive work. (3) Can the incentive be understood. and (4) What are the consequences of implementing the incentive. It is suggested that meaningful evaluations of incentives can only be performed by members of potential host communities. (ERA citation 07:044713)

DE82009045 PC **A02**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Experimentation with a Prototype Incinerator for beta-gamma Waste.
M. G. Farber, K. E. Lewandowski, and G. W. Becker. 1982, 11p DP-MS-81-76, CONF-820424-2
Contract AC09-76SR00001
ANS topical meeting on treatment and handling of radioactive wastes, Richland, WA, USA, 19 Apr 1982.

A test facility for the incineration of suspect and low-level beta-gamma waste has been built and operated at the Savannah River Laboratory. The processing steps include waste feeding, incineration, ash residue packaging, and off-gas cleanup. Demonstration of the full-scale (180 kg/hr) facility with nonradioactive, simulated waste is currently in progress. At the present time, over nine metric tons of material including rubber, polyethylene, and cellulose have been incinerated during three burning campaigns. A comprehensive test program of solid and liquid waste incineration is being implemented. The data from the research program is providing the technical basis for a phase of testing with low-level beta-gamma waste generated at the Savannah River Plant.

DE82009589 PC **A05**/MF **A01**
Allied-General Nuclear Services, Barnwell, SC.
Techniques for Laser Processing, Assay, and Examination of Spent Fuel.
J. H. Gray, R. C. Mitchell, and M. L. Rogell. Nov 81, 96p AGNS-35900-1.2-156
Contract AC09-78ET35900
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Fuel examination studies were performed which have application to interim spent fuel storage. These studies were in three areas, i.e., laser drilling and rewelding demonstration, nondestructive assay techniques survey, and fuel examination techniques survey. (ERA citation 07:046032)

DE82011331 MF **A01**
Sandia Labs., Albuquerque, NM.
Thermal and Mechanical Responses in the Conasauga and Eleana Formations.
J. L. Krumhansl, and L. D. Tyler. 1978, 8p DOE/NBM-2011331
Contract AC04-76DP00789
Portions of document are illegible.
Available in microfiche only.

Two near-surface heater experiments were performed in argillaceous rocks for the purpose of determining the suitability of this rock type for the disposal of heat producing nuclear waste. Site instrumentation included provisions for monitoring both the thermal and mechanical response of the formation. The mechanical behavior of argillaceous rocks was found to be complex and illustrates the necessity of incorporating the dehydration behavior of clays into existing models. The thermal response also reflected the effects of water. Even in the presence of considerable ground water, however, conduction remains the principal method of heat transfer, and computer codes using this assumption give a realistic picture of the in-situ formation behavior. (ERA citation 07:049343)

DE82011689 PC **A19**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Proceedings of the 1981 Subseabed Disposal Program. Annual Workshop.
Jan 82, 431p SAND-81-2498
Contract AC04-76DP00789
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The 1981 Annual Workshop was the twelfth meeting of the principal investigators and program management personnel participating in the Subseabed Disposal Program (SDP). The first workshop was held in June 1973, to address the development of a program (initially known as Ocean Basin Floors Program) to assess the deep sea disposal of nuclear wastes. Workshops were held semi-annually until late 1977. Since November 1977, the workshops have been conducted following the end of each fiscal year so that the program participants could review and critique the total scope of work. This volume contains a synopsis, as given by each Technical Program Coordinator, abstracts of each of the talks, and copies of the visual materials, as presented by each of the principal investigators, for each of the technical elements of the SDP for the fiscal year 1981. The talks were grouped under the following categories; general topics; site studies; thermal response studies; emplacement studies; systems analysis; chemical response studies; biological oceanography studies; physical oceanographic studies; instrumentation development; transportation studies; social environment; and international seabed disposal. (ERA citation 07:046000)

DE82011784 MF **A01**
Sandia National Labs., Albuquerque, NM.
Ground Motion from Earthquakes and Underground Nuclear Weapons Tests: A Comparison as it Relates to Siting a Nuclear Waste Storage Facility at NTS.
L. J. Vortman. Jan 82, 37p SAND-81-2214
Contract AC04-76DP00789
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Ground motion generated by a magnitude 4.3 earthquake at Massachusetts Mountain on the Nevada Test Site was measured at the control point and compared with ground motion generated at about the same distance by four underground nuclear weapons tests. The depth of the earthquake was between 4 and 4.6 km. The resulting signal at the distance considered was almost entirely body-wave components and had little or no contribution from the surface wave. The motion from the relatively shallower weapons tests had a signal with a pronounced surface-wave component. Comparison of the Pseudo Relative Response Velocity (PSRV) plots shows the earthquake signal richer in high frequencies and the weapons-test signals richer in low frequencies. If relationship between ground motion from the two sources can be confirmed for other earthquakes, weapons test ground motion could be used to estimate earthquake ground motion for magnitudes for which probability of occurrence in a given montoring period would be very small. (ERA citation 07:045999)

DE82011940 PC **A07**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Experiments, Conceptual Design, Preliminary Cost Estimates and Schedules for an Underground Research Facility.
G. Korbin, H. Wollenberg, C. Wilson, B. Strisower, and T. Chan. Sep 81, 147p LBL-13190
Contract AC03-76SF00098

Plans for an underground research facility are presented, incorporating techniques to assess the hydrological and thermomechanical response of a rock mass to the introduction and long-term isolation of radioactive waste, and to assess the effects of excavation on the hydrologic integrity of a repository and its subsequent backfill, plugging, and sealing. The project is designed to utilize existing mine or civil works for access to experimental areas and is estimated to last 8 years at a total cost for contruction and operation of $39.0 million (1981 dollars). Performing the same experiments in an existing underground research facility would reduce the duration to 7-1/2 years and cost $27.7 million as a lower-bound estimate. These preliminary plans and estimates should be revised after specific sites are identified which would accommodate the facility. (ERA citation 07:045957)

DE82012016 PC **A06**/MF **A01**
Harvard Univ., Cambridge, MA.
Radioactive Waste Management: A Comparative Study of National Decision-Making Processes. Final Report, September 15, 1978-December 31, 1979.
D. S. Zinberg, and D. Deese. 25 Jan 80, 115p DOE/ER/10106-1
Contract AS02-78ER10106

A report is presented resulting from a comparative study of national decision-making processes in radioactive waste management. By seeking out the variations among the socio-political and institutional components of the nuclear power and radioactive waste policies in ten countries, the authors have attempted to identify means to improve national and international responses to a seemingly intractable problem, the management of wastes from military and commercial nuclear programs worldwide. Efforts were focused on evaluation of comparative national policy formulation processes. Mapping national programs in conjunction with social, political and administrative structure and comparing the similarities and differences among them has revealed six major issues: (1) technological bias in decision-making; (2) lack of natioal strategies for the RWM programs; (3) fragmentation of governmental power structures; (4) crippled national regulatory bodies; (5) complex and competing relations among local, state and federal levels of government; and (6) increased importance of non-governmental actors and public participation. The first two issues are overarching, encompassing the fundamental approach to policy, whereas the last four describe more specific aspects of the decision-making structures.

DE82012035 MF **A01**
Westinghouse Electric Corp., Madison, PA. Advanced Reactors Div.
WAED-HP-103, Health Physics Manual, Revision XII, March 1981. Final Report.
Jan 82, 566p DOE/ET/37247-1-Attach.4
Contract AC02-80ET37247
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The project scope of work included the complete decontamination and decommissioning (D and D) of the Westinghouse ARD Fuel Laboratories at the Cheswick Site in the shortest possible time. This has been accomplished in the following four phases: (1) preparation of documents and necessary paperwork; packaging and shipping of all special nuclear materials in an acceptable form to a reprocessing agency; (2) decontamination of all facilities, glove boxes and equipment; loading of generated waste into bins, barreis and strong wooden boxes; (3) shipping of all bins, barrels and boxes containing waste to the designated burial

site; removal of all utility services from the laboratories; (4) final survey of remaining facilities and certification for nonrestricted use; preparation of final report. This attachment describes the responsibilities, standards, practices and procedures for radiaton protection and safety in the facilities of the Westinghouse Electric Corporation at Cheswick, Pennsylvania. In addition to the application of these standards and procedures, there is continual surveillance of the operations, equipment, and personnel to detect and correct any conditions which might create a health or accident hazard. (ERA citation 07:045919)

DE82012048 PC **A04**/MF **A01**
Lawrence Livermore National Lab., CA.
Discrete-Event Simulation of Nuclear-Waste Transport in Geologic Sites Subject to Disruptive Events. Final Report.
S. Aggarwal, S. Ryland, and R. Peck. 19 Jun 80, 71p UCRL-15378
Contract W-7405-ENG-48
Portions of document are illegible.

This report outlines a methodology to study the effects of disruptive events on nuclear waste material in stable geologic sites. The methodology is based upon developing a discrete events model that can be simulated on the computer. This methodology allows a natural development of simulation models that use computer resources in an efficient manner. Accurate modeling in this area depends in large part upon accurate modeling of ion transport behavior in the storage media. Unfortunately, developments in this area are not at a stage where there is any consensus on proper models for such transport. Consequently, our work is directed primarily towards showing how disruptive events can be properly incorporated in such a model, rather than as a predictive tool at this stage. When and if proper geologic parameters can be determined, then it would be possible to use this as a predictive model. Assumptions and their bases are discussed, and the mathematical and computer model are described. (ERA citation 07:042600)

DE82012135 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Current Status of the Multi-Isotopic Transuranic-Waste-Assay System.
W. E. Kunz, and J. T. Caldwell. 1982, 19p LA-UR-82-787, CONF-820424-6
Contract W-7405-ENG-36
ANS topical meeting on treatment and handling of radioactive wastes, Richland, WA, USA, 19 Apr 1982, Portions of document are illegible.

We have designed, constructed, tested, and are scheduled to field a 206-l barrel-sized working version of our multi-isotopic transuranic assay system. This system uses both passive neutron multiplicity and pulsed active measurements to identify and quantify spontaneous neutron emitters and fissile TRU isotopes. Using the system we can separately quantify up to seven individual transuranic isotopes under favorable conditions with the intrinsic sensitivity to screen or assay barrels at or below the 10 nCi/g transuranic level. Our measured 3 sigma sensitivity for exp 239 Pu is about 0.5 mg. A large range of waste matrix materials can be accommodated by the system, as well as extremes in both gamma-ray and neutron backgrounds. (ERA citation 07:042621)

DE82012138 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Los Alamos Transuranic Waste Size Reduction Facility.
A. Briesmeister, J. Harper, B. Reich, and J. L. Warren. 1982, 16p LA-UR-82-742, CONF-820424-7
Contract W-7405-ENG-36
ANS topical meeting on treatment and handling of radioactive wastes, Richland, WA, USA, 19 Apr 1982.

A transuranic (TRU) Waste Size Reduction Facility (SRF) was designed and constructed at the Los Alamos National Laboratory during the period of 1977 to 1981. This paper summarizes the engineering development, installation, and early test operations of the SRF. The facility incorporates a large stainless steel enclosure fitted with remote handling and cutting equipment to obtain an estimated 4:1 volume reduction of gloveboxes and other bulky metallic wastes. (ERA citation 07:042542)

DE82012262 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Status Report on the Spent-Fuel Test-Climax, Nevada Test Site: A Test of Dry Storage of Spent Fuel in a Deep Granite Location.
L. D. Ramspott, L. B. Ballou, and W. C. Patrick. Mar 82, 13p UCRL-87448, CONF-820303-33
Contract W-7405-ENG-48
Waste management conference, Tucson, AZ, USA, 8 Mar 1982.

The Spent Fuel Test-Climax (SFT-C) is located at a depth of 420 m in the Climax granite at the Nevada Test Site. The test array contains 11 canistered PWR fuel assemblies, plus associated electrical simulators and electrical heaters. There are nearly 900 channels of thermal, radiation, stress, displacement, and test control instrumentation. This paper is a general status report on the test, which started in May 1980.

DE82012263 MF **A01**
Lawrence Livermore National Lab., CA.
Immobilization of High-Level Defense Wastes in SYNROC-D: Recent Research and Development Results on Process Scale-Up.
J. H. Campbell, R. B. Rozsa, and C. L. Hoenig. 15 Mar 82, 14p UCRL-86558, CONF-820424-4
Contract W-7405-ENG-48
ANS topical meeting on treatment and handling of radioactive wastes, Richland, WA, USA, 19 Apr 1982, Portions of document are illegible.
Available in microfiche only.

SYNROC is a titanate-based ceramic waste form being developed to immobilize high-level nuclear reactor wastes. SYNROC-D is a unique variation of SYNROC designed to contain high-level defense wastes, particularly those in storage at the Savannah River Plant (SRP). We review recent research and development on SYNROC-D processing options and report on work in progress on various unit operations. The overall immobilization process can be divided into three general parts: (1) slurry preparation (formulation, reactant addition and blending); (2) powder processing (spray drying, calcination/redox control); and (3) mineralization (densification). Powder processing research is directed toward development of a slurry-fed, fluidized-bed calciner based on the ICPP design. Densification research is focused on use of hot isostatic pressing (HIP) or hot uniaxial pressing (HUP). The successful use of both have been demonstrated. (ERA citation 07:042587)

DE82012373 PC **A04**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Physical and Chemical Characterization of Synthetic Calcined Sludge.
R. V. Slates, W. C. Mosley, Jr., B. Tiffany, and J. A. Stone. Mar 82, 72p DP-1541
Contract AC09-76SR00001
Microfiche only after original copies are exhausted.

Calcined synthetic sludge was chemically characterized in support of engineering studies to design a processing plant to solidify highly radioactive waste at the Savannah River Plant. An analytical technique is described which provides quantitative data by mass spectrometric analysis of gases evolved during thermogravimetric analysis without measurements of gas flow rates or mass spectrometer sensitivities. Scanning electron microprobe analysis, Mossbauer spectroscopy, and several other common analytical methods were also used. Calcined sludge consists primarily of amorphous particles of hydrous oxides with iron, manganese, nickel, and calcium distributed fairly uniformly throughout the powder. Iron, manganese, nickel, and calcium exist in forms that are highly insoluble in water, but aluminum, sulfate, nitrate, and sodium exhibit relative water solubilities that increase in the given order from 60% to 94%. Evolved gas analysis in a helium atmosphere showed that calcined sludge is completely dehydrated by heating to 400 exp 0 C, carbon dioxide is evolved between 100 to 700 exp 0 C with maximum evolution at 500 exp 0 C, and oxygen is evolved between 400 and 1000 exp 0 C. Evolved gas analyses are also reported for uncalcined sludge. A spinel-type oxide similar to NiFe sub 2 O sub 4 was detected by x-ray diffraction analysis at very low-level in calcined sludge.

DE82012532 PC **A03**/MF **A01**
Atomics International Div., Richland, WA. Energy Systems Group.
Preliminary Analysis of West Valley Waste Removal System Equipment Development and Mock Demonstration Facilities.
G. P. Janicek. Jun 81, 46p RHO-LD-151
Contract AC06-77RL01030

This report defines seven areas requiring further investigation to develop and demonstrate a safe and viable West Valley Waste Removal System. These areas of endeavor are discussed in terms of their minimum facility requirements. It is concluded that utilizing separated specific facilities at different points in time is of a greater advantage than an exact duplication of the West Valley tanks. Savannah River Plant's full-scale, full-circle and half-circle tanks, and their twelfth scale model tank would all be useful to varying degrees but would require modifications. Hanford's proposed full-size mock tank would be useful, but is not seriously considered because its construction may not coincide with West Valley needs. Costs of modifying existing facilities and/or constructing new facilities are assessed in terms of their benefit to the equipment development and mock demonstration. Six facilities were identified for further analysis which would benefit development of waste removal equipment. (ERA citation 07:042574)

DE82013193 PC **A04**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Workshop on the Leaching Mechanisms of Nuclear-Waste Forms, October 27-28, 1981. Summary Report.
J. E. Mendel. Apr 82, 66p PNL-4228
Contract AC06-76RL01830

The purpose of this informal workshop was to initiate the program and achieve the following goals: (1) acquaint laboratory investigators (data generators) with the needs of the mathematical modelers (data users). Session I was devoted to a tutorial by D.D. Jackson, mathematical modeler for the leaching mechanisms program, on PROTOCOL, a general case waste form leaching model; (2) define important testing parameters, based on the present state of knowledge. To achieve this, a number of important testing parameters were identified for special discussion in Session II; (3) develop an understanding of the interrelationships between the activities of leaching mechanisms program participants, and begin definition of the specific role of each participant in the overall program; and (4) establish good communication between the leaching mechanisms program and related programs, particularly the waste form leaching program at the Savannah River Laboratory (SRL) and the various Nuclear Waste Terminal Storage (NWTS) waste package programs. The agenda for the workshop is attached as Appendix A; a list of attendees is in Appendix B. Because this workshop was devoted to preliminary planning for the leaching mechanisms program, the presentations and discussions were purposely kept informal. This report represents a synopsis of the proceedings that has been prepared by the leaching mechanisms coordinator and reviewed by the workshop participants. (ERA citation 07:042561)

DE82013246 PC **A02**/MF **A01**
Atomics International Div., Canoga Park, CA. Energy Systems Group.
CsAlSi sub 5 O sub 12 : A Possible Host for exp 137 Cs Immobilization.
T. Adl, and E. R. Vance. 31 Mar 82, 21p DOE/ET/41900-14, ESG-DOE-13369
Contract AC09-79ET41900

CsAlSi sub 5 O sub 12 exhibits more acid resistance than pollucite (CsAlSi sub 2 O sub 6). At pH values of 1.02 and 1.40, the extraction of Cs from CsAlSi sub 5 O sub 12 at 25 exp 0 C was approximately proportional to the square root of leach time. The Cs extraction at 25 exp 0 C varied as (H exp +) exp 0 exp 36 over the pH range of 1 to 6. Also, the Cs extraction in various brines at 300 exp 0 C/30 MPa was comparable with that for pollucite. CsAlSi sub 5 O sub 12 can be crystallized at about 1000 exp 0 C from calcines if a small amount of CaO is present, but in the absence of such sintering acids, crystallization temperatures of about 1400 exp 0 C are necessary. Compatibility data were also obtained with respect to several other phases with which CsAlSi sub 5 O sub 12 might be expected to coexist in tailored ceramics designed for high-level defense waste. (ERA citation 07:044199)

DE82701485 MF **A01**
Kyoto Univ., Osaka (Japan). Research Reactor Inst.
Influence of the Effective Density of Ferric Hydroxide Floc on Its Sedimentation Velocity.
S. Kimura, M. Sasaki, Y. Kondo, and T. Tsutsui. 26 Jan 81, 12p KURRI-TR-208

In Japanese.
U.S. Sales Only. Available in microfiche only.

It has been known that the sedimentation velocity of chemical coagulation floc in aqueous solution depends on the effective density of the floc, the floc size, viscosity of the solution and other chemical conditions. Among these factors, the effective density of ferric hydroxide floc is co-related to the surface potential and the floc size. In this report, however, it was revealed experimentally that the effective density especially depends on the surface potential for the small size floc, but it is independent for the larger size than 2 mm diameter. Then, the relations between the effective density and the floc size were expressed as following formula, rho/sub e/ = a.d/sub p//sup -n/, where, rho/sub e/ and d/sub p/ denote effective density and floc size, respectively. Furthermore, a and n are constants which will be decided depending on the conditions at floc formation such as pH and co-existing chemical species during the growth of the floc. Since the sedimentation velocity of the floc changes according to rho/sub p/.d sub 02 , it is known to be proportional to d/sub p//sup (2-n/) after all. Also, the following facts were observed in the present work, the sedimentation velocity of ferric hydroxide floc produced at pH 8 and pH 9 was respectively faster than that produced at pH 7 and pH 10. (Atomindex citation 13:661021)

DE82780469 MF **A01**
Ceskoslovenska Vedeckotechnicka Spolecnost, Prague.
Disposal of Radioactive Wastes from Nuclear Power Plants. 2. National Conference of CSVTS.
1981, 52p INIS-mf-6897, CONF-8004208-(Sum.)
National conference on the disposal of radioactive wastes from nuclear power plants, Tale, Czechoslovakia, 15 Apr 1980.
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

Separate abstracts have been prepared for items within scope for inclusion in the Energy Data Base.

DE82902176 PC **A02**/MF **A01**
Atomic Industrial Forum, Inc., Washington, DC.
Nuclear Waste/Nuclear Power: Their Futures Are Linked.
L. T. Skoblar. 1981, 13p CONF-8110162-1
52. annual executive conference, Palm Springs, CA, USA, 19 Oct 1981, Portions of this report are illegible.

This paper briefly reviews current aspects of radioactive waste disposal techniques and transportation. Addressed are high-level and low-level radioactive wastes, interim spent fuel storage and transportation. The waste options being explored by DOE are listed. Problems of public acceptance will be more difficult to overcome than technical problems. (ERA citation 07:049339)

DE82903143 PC **A04**/MF **A01**
Chem-Nuclear Systems, Inc., Bellevue, WA.
Feasibility of Applications of Microwave Technology for Nuclear Power Plant Radioactive Wastes. Final Report.
J. R. Potter, and A. S. Woodle. Apr 82, 71p EPRI-NP-2334, TPS-80-756
Portions of document are illegible.

A study into the feasibility of using microwave energy for drying of radioactive wastes is presented. A review of process techniques now in use and proposed is also included and the basics of microwave heating is discussed. A review of tests performed includes: 1. scoping testing; and 2. laboratory testing in batch and continuous feed modes. Finally, a preliminary design is presented for both a batch system and continuous feed system for processing a minimum of 5000 cu. ft. of ion exchange resin beads per year. (ERA citation 07:042529)

PB82-254467 PC **E04**/MF **E04**
Commission of the European Communities, Luxembourg.
The Commuities' Research and Development Programme on Decommissioning of Nuclear Power Plants.
Annual progress rept. no. 1.
c1981, 62p EUR-7440-EN, ISBN-92-825-2421-3
Customers in the European Community countries should apply to the Office for Official Publications of the European Communities, B.P. 1003, Luxembourg.

All the decommissioning projects are at an early stage or had not yet commenced at the time of writing the report. Seven major topics are covered: long-term integrity of buildings and systems; decontamination for decommissioning purposes; dismantling techniques; treatment of specific waste materials, i.e. steel, concrete, graphite; large transport containers; estimation of the quantities of radioactive waste; influence of nuclear power plant design on decommissioning. The results from this program will appear in subsequent reports. It is recommended that design concepts should be devised which would prevent the activation of shield concrete of the reactor; that ways of reducing the amount of cobalt in materials of construction should be studied so that 60Co formation is inhibited; and that guidelines for the design, operation and decommissioning of nuclear power plants should be evolved.

18H. Radioactivity

DE82008184 MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Pre-Decontamination gamma-Ray Surface Scans in TMI-2 Containment Building 305' Elevation.
E. D. Barefoot, D. S. Cameron, J. S. Cline, J. A. Daniel, and D. G. Keefer. Feb 82, 18p GEND-INF-009
Contract AC07-76ID01570
Portions of this report are illegible.
Best available copy from document source. Available in microfiche only.

On Decembr 16, 1981 entry was made into the TMI-2 containment building to perform gamma-ray scans on surfaces of the 305' level. Five areas were selected for these measurements: two of them were of surfaces of walls, two were of floor surfaces under the reactor core flood tanks, and the remaining was of a floor surface in an area that had been receiving a great deal of personnel traffic. The results showed contamination levels of less than 1 mu Ci/cm exp 2 for all of the surfaces, considerably less than was observed at the locations of previous scans. Two of the areas showed no net activity and minimum detectable limits are listed that are less than 0.3 mu Ci/cm exp 2 . (ERA citation 07:050429)

DE82009919 PC **A02**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Deposition of Air-Borne exp 238 Pu Near a Chemical Separation Facility.
J. H. Horton, and D. D. Gay. Jan 82, 17p DP-1585
Contract AC09-76SR00001

Three methods were compared to measure deposition of exp 238 Pu released from a chemical separation facility at the Savannah River Plant, Aiken, SC. The following methods were used: adhesive paper; a collector of rain and dryfall; and soil samples. Excellent agreement among the three methods was found. The measured deposition for the particular source term and meteorological conditions at the Savannah River Plant is described by y proportional to x/sup -1.36/ where y is the pCi of exp 238 Pu deposited per square meter per mC: exp 238 Pu released, and x is distance in meters from the source.

DE82009920 PC **A02**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Particle Size Distribution of Airborne Plutonium Near a Chemical Separations Facility.
D. D. Gay, and J. R. Watts. Dec 81, 15p DP-1610
Contract AC09-76SR00001

Particulate matter containing Pu-238 and Pu-239,240 emitted from a stack at the Savannah River Plant was collected and fractionated by size with cascade impactors. Two impactor measurements were made at a distance of 200 meters from the H-Area stack and a third was at a distance of 420 meters. Annual collections were made for three years. The Pu-238 and Pu 239,240 concentrations were determined for each of the size fractions. The fractions collected at 200 m from the 62 m stack showed a biphasic curve for both Pu-238 and Pu-239,240. The highest concentration for both Pu-238 and Pu-239,240 were found in the <0.49 mu m fraction, with the secondary peak occurring in the fractions greater than 3.0 mu m. At 420 meters from the stack, the size distribution curves for Pu-238 and Pu-239,240 were not biphasic; only one peak appeared and that was for the fraction less than 0.49 mu m. The doses to different organs from plutonium inhalation were calculated for the particle size distributions obtained in this study. The maximum potential 50-year dose commitment to the bone, the critical organ, for one year continuous exposure was 13 mrem for Pu-238 and 0.44 mrem for Pu-239,240 at 200 meters from the H-Area stack.

DE82012284 PC **A02**/MF **A01**
EG and G, Inc., Goleta, CA. Energy Measurements Group.
Aerial Radiological Survey of the Susquehanna Steam Electric Station and Surrounding Area, Berwick, Pennsylvania. Date of Survey: September 1980.
Mar 82, 9p EGG-1183-1811
Contract AC08-76NV01183
Microfiche only after original copies are exhausted.

An aerial radiological survey was performed from 12 to 22 September 1980 over a 188-square-kilometer area surrounding the Susquehanna Steam Electric Station near Berwick, Pennsylvania. All gamma ray data were collected along flight lines oriented southwest to northeast. The lines were spaced 152 meters apart and flown at an altitude of 91 meters above ground level. Processed data showed that all gamma rays detected within the survey area were those expected from naturally occurring terrestrial background emitters. Count rates obtained from the aerial platform were converted to exposure rates at 1 meter above the ground and are presented in the form of a radiation contour map. The observed exposure rates were between 8 and 23 microroentgens per hour (mu R/h), with most of the area ranging from 8 to 15 mu R/h. These values include an estimated cosmic ray contribution of 4 mu R/h. The exposure rate obtained from soil samples taken from within the survey site were in agreement with the aerial data.

DE82012433 PC **A02**/MF **A01**
EG and G, Inc., Las Vegas, NV. Energy Measurements Group.
Aerial Radiological Survey of the Joseph M. Farley Nuclear Plant and Surrounding Area, Dothan, Alabama.
T. C. Maguire, and G. R. Shipman. Mar 82, 13p EGG-1183-1812
Contract AC08-76NV01183
Microfiche only after original copies are exhausted.

An aerial radiological survey was performed during the period 8 to 19 December 1979 over a 2000 square kilometer area centered on the two unit Joseph M. Farley Nuclear Plant near Dothan, Alabama. Radiological data were collected by flying north-south lines spaced 900 meters apart at an altitude of 150 meters above ground level. Processed data showed that all gamma rays detected within the survey area were those expected from naturally occurring radionuclides. Count rates obtained from the aerial platform were converted to exposure rates at 1 meter above the ground and are presented in the form of a radiation contour map. The observed exposure rates were between 4 and 12 microroentgens per hour (mu R/h), with most of the area ranging between 4 and 10 mu R/h. These values include an estimated cosmic ray contribution of 4.0 mu R/h but do not include any contribution from airborne radionuclides, i.e., radon. Exposure rates obtained from ground measurements taken within the survey area were in close agreement with the aerial data. The data were also in close agreement with those obtained from a similar survey conducted during March 1977. Comparison of the results from both surveys indicated that no detectable change in the radiological characteristics of the survey area has occurred due to the operation of unit number 1 during the intervening period. The same equipment and procedures were utilized for both surveys. (ERA citation 07:044667)

DE82012528 PC **A06**/MF **A01**
Lawrence Livermore National Lab., CA.
Calculated Concentrations of Any Radionuclide Deposited on the Ground by Release from Underground Nuclear Detonations, Tests of Nuclear Rockets, and Tests of Nuclear Ramjet Engines.
H. G. Hicks. Nov 81, 107p UCRL-53228
Contract W-7405-ENG-48
Microfiche only after original copies are exhausted.

This report presents calculated gamma radiation exposure rates and ground deposition of related radionu-

clides resulting from three types of event that deposited detectable radioactivity outside the Nevada Test Site complex, namely, underground nuclear detonations, tests of nuclear rocket engines and tests of nuclear ramjet engines. (ERA citation 07:044711)

DE82012616 PC **A07**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Effect of Radon Transport in Groundwater Upon gamma-Ray Borehole Logs.
P. H. Nelson, R. Rachiele, and A. Smith. Sep 80, 130p LBL-11180, SAC-30
Contract W-7405-ENG-48

Granitic rock at an experimental waste storage site at Stripa, Sweden, is unusually high in natural radioelements (40 ppM uranium) with higher concentrations occurring locally in thin chloritic zones and fractures. Groundwater seeping through fractures into open boreholes is consequently highly anomalous in its radon content, with activity as high as one microcurie per liter. When total count gamma-ray logs are run in boreholes where groundwater inflow is appreciable, the result is quite unusual: the radon daughter activity in the water adds considerably to the contribution from the rock, and in fact often dominates the log response. The total gamma activity increases where radon-charged groundwater enters a borehole, and remains at a high level as the water flows along the hole in response to the hydraulic gradient. As a consequence, the gamma log serves as a flow profile, locating zones of water entry (or loss) by an increase (or decrease) in the total gamma activity. A simple model has been developed for flow through a thin crack emanating radon at a rate E showing that the radon concentration of water entering a hole is E/ lambda h, where lambda is the radon decay rate and h the crack aperture, assuming that the flow rate and crack source area are such that an element of water resides within the source area for several radon half-lives or more. Concentration measurements can provide a measurement of the inflow rate. Data from the 127-mm holes in the timescale drift behave in this fashion.

DE82012853 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Effect of Organic Complexants on the Mobility of Low-Level-Waste Radionuclides in Soils.
J. L. Swanson. Feb 82, 13p PNL-SA-10223, CONF-820424-8
Contract AC06-76RL01830
ANS topical meeting on treatment and handling of radioactive wastes, Richland, WA, USA, 19 Apr 1982.

The effect of certain organic complexants on the distribution of some radionuclides between solution and soil has been measured. The complexants and radionuclides examined are some of those most likely to be present in low-level waste disposal sites; Cs, Sr, Ni, Co, and Eu radionuclides, and EDTA, DTPA, oxalate, and citrate complexants. The effect of complexants was found to vary widely; in some systems there was no effect and in other systems there were large effects. In some cases slow rates of reaction have not allowed equilibrium measurements to be made. (ERA citation 07:044698)

DE82013231 PC **A03**/MF **A01**
Mound Facility, Miamisburg, OH.
Annual Environmental Monitoring Report: Calendar Year 1981.
B. M. Farmer, and D. G. Carfagno. 21 Apr 82, 50p MLM-2930
Contract AC04-76DP00053
Portions of document are illegible.

The environment locally surrounding Mound was monitored primarily for tritium and plutonium-238. The results are reported for CY-1981. The environmental medium analyzed included air, water, vegetation, foodstuffs, and sediment. The average concentrations of plutonium-238 and tritium were within the applicable standards (adopted by the US DOE) for radioactive species. (ERA citation 07:044671)

DE82701491 PC **A03**/MF **A01**
DSMA Atcon Ltd., Toronto (Ontario).
Seismic and Radon Monitoring of Algocen Site at Elliot Lake.
Mar 81, 26p INFO-0035
U.S. Sales Only.

Remedial works to reduce radon/radon daughters to acceptable levels in houses in Elliot Lake have been going on for the last three years under the Atomic Energy Control Board (AECB) remedial action program. In December 1978, a routine inspection of treated houses showed extensions to cracks already filled, and the opening up of filled cracks. The homeowners attributed this to the blasting operations for building construction which were going on in town at that time. This prompted the need to monitor any subsequent major scale blasting in the town and to record the damages in nearby houses. This report presents the results of monitoring one such major blasting operation which was carried out between March 1979 and June 1979 for the building of the Algocen Shopping Mall east of Hutchison Avenue. The AECB were concerned about the possible damage to the houses along Hutchison Avenue which had already received remedial treatment to prevent the entry of radon gas, and authorized DSMA/Acres to record the level of vibrations and damages in these houses during the blasting period. (Atomindex citation 13:661362)

NUREG/CP-0025 PC **A08**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Proceedings of the Workshop on Environmental Assessment Held at National Bureau of Standards, Gaithersburg, Maryland on December 15-18, 1981,
E. C. Watson. Jul 82, 159p PNL-4235

The workshop was convened to consider the technical basis and methodology for regulatory environmental assessment in 1981. The findings and recommendations of the participants addressed several research needs common to aquatic, terrestrial and atmospheric sciences applicable to environmental assessment. Model validation - The view often expressed was that there simply is no basis in fact for having a high degree of confidence in estimates derived from existing models. Source term characterization - The physical state and chemical characteristics of the source term are needed to estimate transformations within the plume, depletion of the plume due to dry deposition, and rainout. Some particle size distribution information applicable to normal operating conditions is available but little or no information exists for releases during accidents. Development of screening techniques - Reliable means of identifying and separating trivial matters from important problems. Techniques using reasonably conservative models to identify effects, pathways, nuclides or pollutants warranting high priority research. This would be closely coupled and dependent upon de minimis environmental effects to be established by the regulatory functions.

NUREG-0837-V2-N1 PC **A09**/MF **A01**
Nuclear Regulatory Commission, King of Prussia, PA. Region I.
NRC TLD Direct Radiation Monitoring Network, Progress Report January-March 1982.
Quarterly rept.,
F. Costello, T. Thompson, and L. Cohen. Jul 82, 190p
See also NUREG-0837-V1-N1-2.

The report provides the status and results of the NRC Thermoluminescent Dosimeter (TLD) Direct Radiation Monitoring Network. It presents the radiation levels measured in the vicinity of NRC licensed facility sites throughout the country for the first quarter of 1982.

18I. Reactor Engineering and Operation

DE82005218 MF **A01**
General Atomic Co., San Diego, CA.
Nuclear Gas Turbine: A Perspective on a Long-Term Advanced-Technology HTGR Plant Option.
C. F. McDonald, and C. O. Peinado. Nov 81, 19p GA-A-16461, CONF-820407-1
Contract AT03-76SF70046
27. ASME international gas turbine conference, London, UK, 18 Apr 1982, Portions of document are illegible. MN only.
Microfiche copies only.

Comprehensive design studies and assessments were carried out in the 1970s on an advanced, direct-cycle high-temperature gas-cooled reactor (HTGR) option. These led to conclusions in 1980 that an extensive development effort was necessary to establish a technically viable gas turbine HTGR (HTGR-GT) plant to satisfy demanding safety and licensing criteria and that further design innovation was necessary to identify plant features for improved economics. Accordingly, the steam cycle HTGR was designated as the lead plant and the HTGR-GT classed as a long-term, advanced technology, second-generation HTGR plant option. With the necessary development, a dry-cooled gas turbine plant with a reactor outlet temperature of approximately 950 exp 0 C, operating in a combined cycle mode (with an efficiency of over 50%) or cogeneration mode (power plus process steam production), could be realized in the early decades of the 21st century. This paper reviews the status of the Brayton cycle plant and gives a perspective on the HTGR-GT plant as a follow-on option to the steam Rankine cycle lead plant. (ERA citation 07:050194)

DE82005400 MF **A01**
General Electric Co., Sunnyvale, CA. Advanced Reactor Systems Dept.
Supplementary Information on Series II Test A-5 Test Conditions.
16 Nov 81, 14p DOE/SF/70030-T51
Contract AT03-76SF70030
Best available copy from document source. Available in microfiche only.

Test planning and test preparation for LLTR Series II Test A-5 are continuing at GE and ETEC. The main objective for this test is to obtain data on the type and magnitude of steam tube blowout failures resulting from worst case leak conditions under the superheater hot standby condition (i.e., the plant condition considered most susceptible to steam tube blowout failures from wastage/overheating). A corollary objective is to add large quantities of steam (i.e. approx. 330 lbs) to simulate the amount that could be added in a plant system (such as CRBRP) before pressure would build up in the intermediate Heat Transport System to blow the expansion tank rupture disc. This report recommends the preferred method for operating the LLTR primary/secondary steam systems for Test A-5. i.e., Option 5 - Common Supply Tanks for Primary and Secondary Systems. (ERA citation 07:043614)

DE82007740 MF **A01**
Massachusetts Inst. of Tech., Cambridge.
Subchannel and Bundle Friction Factors and Flowsplit Parameters for Laminar, Transition, and Turbulent Longitudinal Flows in Wire-Wrap Spaced Hexagonal Arrays.
J. T. Hawley, C. Chiu, W. M. Rohsenow, and N. E. Todreas. Aug 80, 128p DOE/ET/37240-79TR
Contract AS02-76ET37240
Portions of this report are illegible.
Best available copy from document source. Available in microfiche only.

Correlations are presented for subchannel and bundle friction factors and flowsplit parameters for laminar, transition and turbulent longitudinal flows in wire wrap spaced hexagonal arrays. These results are obtained from pressure drop models of flow in individual subchannels. For turbulent flow, an existing pressure drop model for flow in edge subchannels is extended, and the resulting edge subchannel friction factor is identified. Using the expressions for flowsplit parameters and the equal pressured drop assumption, the interior subchannel and bundle friction factors are obtained. For laminar flow, models are developed for pressure drops of individual subchannels. From these models, expressions for the subchannel friction factors are identified and expressions for the flowsplit parameters are derived. (ERA citation 07:046732)

DE82008019 MF **A01**
Helium Breeder Associates, La Jolla, CA.
GCFR Demonstration Plant: Conceptual Design and Status Report.
Dec 80, 351p DOE/SF/10510-T10-V.1
Contract AC03-79SF10510
Portions of this report are illegible.
Best available copy from document source. Available in microfiche only.

Helium Breeder Associates (HBA), a non-profit corporation, has been the program manager and technical integrator of the Gas-Cooled Fast Reactor (GCFR) development effort since 1977. When DOE discontinued support of the GCFR in 1980, the HBA members undertook the task of providing for an orderly termination and documentation of the program. HBA does not agree with the government's rational for withdrawing support for this promising technology and has directed

its termination and documentation toward preserving the current state of its development. Toward that end, HBA has compiled the following report which is a summary of the conceptual design of the demonstration plant and status of the program as of the end of 1980. It includes summaries of tasks that have not evolved to a final conclusion. Although the report has not been subjected to formal review and approval by the designers, it is intended to provide the reader with the design considerations that were current at the time of program termination. It is hoped that the report will be useful in restarting the program in the future by establishing the basis of the completed conceptual design and indicating a logical path for new design and development. (ERA citation 07:050216)

DE82011134 MF **A01**
Atomics International Div., Richland, WA. Rockwell Hanford Operations.
Cover-Gas-Seal Component Development: Dynamic Inflatable-Plug Seal Improvement.
P. H. Horton. 15 Sep 77, 35p DOE/SF/71011-T5
Contract AT03-76SF71011
Portions of this report are illegible.
Best available copy from document source. Available in microfiche only.

This report documents the 1) radial compliance and 2) low friction coating tests conducted on the CRBRP Rotating Plug Inflatable Seals per test plan N707TR810014. Test results show that narrowing the seal blade from 0.25 to 0.12 in. will effectively reduce dynamic drag from 30 to 20 lb/ft under nominal conditions and will increase seal radial compliance from 0.12 to 0.30 in. without an unacceptable rise in dynamic drag. Tests also demonstrated that application of a teflon coating to the seal wear surface reduced breakaway drag by 25% based on results of comparison dwells. (ERA citation 07:043428)

DE82011690 PC **A15**/MF **A01**
General Atomic Co., San Diego, CA.
HTGR Gas-Turbine Program. Semiannual Progress Report for Period Ending March 31, 1980.
Jan 82, 345p GA-A-15988
Contract AT03-76SF70046
Portions of document are illegible.
Microfiche only after original copies are exhausted.

This report describes the conceptual design and analysis performed by General Atomic Company and its subcontractors for the US Department of Energy on the direct cycle gas turbine high-temperature gas-cooled reactor. The primary accomplishments for this period were cost reduction studies, turbomachinery failure analysis, and alternate plant concept evaluation. (ERA citation 07:046714)

DE82012527 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Review of the PASNY Systems Interaction Study.
H. P. Alesso. 1 Mar 82, 12p UCID-19130
Contract W-7405-ENG-48
Portions of document are illegible.

The objective of this review is to evaluate and make recommendations on the Systems Interaction (SI) methodology proposed by the Power Authority of the State of New York (PASNY) for application to Indian Point No. 3.

DE82013380 PC **A05**/MF **A01**
Oak Ridge National Lab., TN.
High Flux Isotope Reactor Technical Specifications.
Apr 82, 93p ORNL/TM-5711/R1
Contract W-7405-ENG-26

Technical specifications are presented concerning safety limits and limiting safety system settings; limiting conditions for operation; surveillance requirements; design features; administrative controls; and accidents and anticipated transients. (ERA citation 07:046877)

DE82013381 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
Technical Specifications Tower Shielding Reactor II.
Apr 82, 52p ORNL/TM-4641/R1
Contract W-7405-ENG-26

Technical specifications are presented concerning safety limits and limiting safety system settings; limiting conditions for operation; surveillance; design features; and administrative control. (ERA citation 07:046872)

DE82013558 PC **A04**/MF **A01**
Wisconsin Univ.-Milwaukee. Coll. of Engineering and Applied Science.
Experimental Design for Reflection Measurements of Highly Reactive Liquid or Solid Substances with Application to Liquid Sodium.
S. H. Chan, and A. A. Gossler. 30 Jun 80, 59p DOE/ET/37227-6
Contract AS02-76ET37227
Portions of document are illegible.

This technical report describes the experimental part of a program on thermal radiation properties of reactor materials. A versatile goniometer system with associated electronic components and mechanical instruments has been assembled. It is designed to measure spectral, specular reflectances of highly reactive liquid or solid substances over a spectral range of 0.3 mu to 9 mu and incidence angles of 12 exp 0 to 30 exp 0 off the normal direction. The capability of measuring reflectances of liquid substances clearly distinguishes this experimental design from conventional systems which are applicable only to solid substances. This design has been used to measure the spectral, specular reflectance of liquid sodium and preliminary results obtained are compared with those of solid sodium measured by other investigators. (ERA citation 07:046731)

DE82780446 MF **A01**
Gesellschaft fuer Reaktorsicherheit m.b.H., Cologne (Germany, F.R.).
List of Reports in Reactor Safety Research by BMFT, USNRC, EPRI and JSTA. Period of Coverage: October 1 to December 31, 1980.
Jan 81, 71p GRS-F-100
In German.
U.S. Sales Only. Available in microfiche only.

This list reviews reports from the Federal Republic of Germany, from the United States of America and from Japan concerning special problems in the field of Reactor Safety research. According to the cooperation of the Bundesminister fuer Forschung und Technologie (BMFT) with the United States Nuclear Regulatory Commission (USNRC), the Electric Power Research Institute (EPRI), and the Japan Science and Technology Agency (JSTA) these reports are available in the Gesellschaft fuer Reaktorsicherheit. The list pursues the following order: Country of origin, problem area concerned, according to the Reactor Safety Research Program of BMFT, reporting organization. The list of reports appears quarterly. (ERA citation 07:043677)

DE82901856 MF **A01**
Electric Power Research Inst., Palo Alto, CA. Nuclear Power Div.
BWR Transient Response Blowdown/Emergency Core Cooling (BD/ECC) Test Phase: 1980 Activities.
S. P. Kalra. Jan 82, 188p EPRI-NP-2224-SR
Portions of this report are illegible.
Best available copy from document source. Available in microfiche only.

System performance and thermal response characteristics of BWRs during the blowdown phase of the postulated loss-of-coolant accident conditions were investigated in a test apparatus with different, scaled configurations. Effects of the configuration change on the system responses were identified. Test data obtained served as base-line data for the blowdown/emergency core cooling interaction experiments and as information to tie back to the previous 7 x 7 blowdown heat transfer tests. Comparisons of the predictions with the tests were made. (ERA citation 07:050417)

DE82902702 MF **A01**
Power Reactor and Nuclear Fuel Development Corp., Oarai (Japan). Oarai Engineering Center.
Out-of-Pile Experiments for Fission-Gas Release in LMFBR Fuel Subassemblies: Gas Release into Blockage Wake Region with a Wire-Wrapped 37-Pin Bundle.
F. Namekawa, K. Yamaguchi, and K. Haga. Dec 81, 8p JAPFNR-685, CONF-811101-28, PNC-N---941-81-241
Winter annual meeting of the ASME Technology and Society Division, Washington, DC, USA, 15 Nov 1981.
Portions of document are illegible.
Microfiche copies only. U.S. Sales Only.

This paper deals with fuel pin cooling capability under fission gas release into a wake region of local blockage in a fuel subassembly of an LMFBR, as a consequence of pin failure caused by a local blockage. Experiments for fission gas release into a locally blocked 37-pin bundle are described and results are given regarding various fission gas release modes. Data revealed that only at the gas accumulation zone in the wake region did temperature behind blockage increase significantly. The temperature field strongly depends on both coolant velocity and gas release rate. Present results indicate that no significant pin failure propagation would occur, under reactor conditions, even if local dryout occurred due to fission gas release.

NUREG-0020-V6-N4 PC **A17**/MF **A01**
Nuclear Regulatory Commission, Washington, DC.
Licensed Operating Reactors: Status Summary Report, Data as of March 31, 1982.
Apr 82, 376p
See also NUREG-0020-V6-N3, and NUREG-0020-V5-N11.

The OPERATING UNITS STATUS REPORT - LICENSED OPERATING REACTORS provides data on the operation of nuclear units as timely and accurately as possible. This information is collected by the Office of Management and Program Analysis from the Headquarters staff of NRC's Office of Inspection and Enforcement, from NRC's Regional Offices, and from utilities. The three sections of the report are: monthly highlights and statistics for commercial operating units, and errata from previously reported data; a compilation of detailed information on each unit, provided by NRC's Regional Offices, IE Headquarters and the utilities; and an appendix for miscellaneous information such as spent fuel storage capability, reactor-years of experience and non-power reactors in the U.S. It is hoped the report is helpful to all agencies and individuals interested in maintaining an awareness of the U.S. energy situation as a whole.

PB82-253766 PC **A04**/MF **A01**
Cambridge Univ. (England). Dept. of Engineering.
The Mathematics of Nuclear Engineering.
Final rept.,
J. D. Lewins. 1982, 66p CUED/A-NUCL/TR-1-1982
Also pub. in ISSN-0262-8058.

The analysis carried out related only to those points that are peculiar to nuclear power; it did not deal explicitly with those aspects that are broadly common to other fields of engineering application. The study began by considering the representation of the transformation of matter at the nuclear level by radioactive decay and neutron transmutation. Next, the problem of the distribution of neutrons and other particles was investigated as a transport theory problem. Some of the approximation methods for this problem, particularly diffusion theory, were also considered, with emphasis on steady-state problems. Reactor kinetics and control were studied where relatively rapid transients are involved. Finally, the longer-term changes involved with the nuclear fuel cycle were analzed.

PB82-255266 PC **A04**/MF **A01**
California Univ., Berkeley. Earthquake Engineering Research Center.
The Influence of Base Isolation on the Seismic Response of Light Secondary Equipment.
James M. Kelly. Feb 82, 73p UCB/EERC-81/17

The seismic response of light secondary systems such as pumps, valves, control devices, and piping systems in a power plant is produced by the response of the primary structural system to the seismic ground motion with the result that very high accelerations can be induced in such secondary systems. This response can be reduced through the use of base isolation. Aseismic base isolation, a design strategy founded on the premise that a building can be decoupled from the damaging horizontal components of seismic ground motion, can be applied not only to attenuate the response of the primary structural system but to limit the response of secondary systems. The benefits of base isolation apply equally to existing structures required to be strengthened against seismic attack.

DE82008611 MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Physical Protection: Threat Response and Performance Goals as Applied at the Nuclear Material Inspection and Storage (NMIS) Building.
T. H. Sanford. 1982, 8p EGG-M-09081, CONF-820202-11
Contract AC07-76ID01570
AICHE 1982 national winter meeting, Orlando, FL, USA, 28 Feb 1982, Portions of document are illegible.
MN only.
Microfiche copies only.

Only one aspect of nuclear security has been discussed here, a disciplined approach to physical protection systems (PPS) design. The best security against a multitude of threats to the nuclear industry is a dynamic and multifaceted safeguards program. It is one that combines PPS design with employee screening, reliability or behavioral observation programs, procedural control, assessment techniques, response capabilities, and security hardware. To be effective, such a program must be supported by management and applied uniformly to all personnel, including the safeguards and security staff. (ERA citation 07:042610)

DE82012516 PC **A03**/MF **A01**
Exxon Nuclear Idaho Co., Inc., Idaho Falls.
Model of Iodine-129 Process Distributions in a Nuclear-Fuel-Reprocessing Plant.
G. J. McManus, F. A. Duce, S. J. Fernandez, and L. P. Murphy. Apr 82, 46p ENICO-1108
Contract AC07-79ID01675
Portions of document are illegible.
Microfiche only after original copies are exhausted.

This report documents the development, demonstration, and verification of a model of iodine-129 pathways in a nuclear fuel reprocessing plant. Laboratory experimental results are presented on iodine-129 chemical forms and also on evaporator and solvent extraction behavior. In-plant sampling results for all accessible processes are also reported. A computer program using the developed model is documented. Although the Idaho Chemical Processing Plant (ICPP) is somewhat unique in its processes (total dissolution of a variety of fuel types) it is believed these results may be used in other types of fuel reprocessing plants.

DE82780082 PC **A06**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Heisse Chemie.
1981 Purex Distribution Data Index.
G. Petrich, and Z. Kolarik. Jan 81, 112p KFK-3080
U.S. Sales Only.

Distribution coefficients of U(VI), U(IV), Pu(IV), Pu(III), Np(VI), Np(IV) and nitric acid between aqueous nitrate solutions and 30 vol% TBP in an alkane diluent were systematically gathered from the available literature. A preceding report (KFK 2536, 1977) was revised and greatly extended by recently published data and new unpublished measurements. The compilation of this report includes a total number of 4285 distribution coefficients. Part 1 contains data on the distribution of U(VI), Pu(IV) and nitric acid, part 2 contains data on U(VI) and U(IV), part 3 contains data on U(VI), Pu(IV), Pu(III) and nitric acid in the presence of hydrazinium nitrate, part 4 contains data on Np(VI) and Np(IV) with and without the presence of U(VI). In each part of the report the distribution data are grouped according to increasing equilibrium concentrations of nitric acid and subgrouped along the respective metal concentrations in the aqueous phase. Each subgroup is segmented in 2 temperature ranges. Moreover, the data of part 1 are also ordered according to their origin. The data in part 1 were critically evaluated and apparently erroneous distribution coefficients were detected by a combined grouping-modelling procedure. (ERA citation 07:042445)

PB82-253246 PC **E05**/MF **E05**
Commission of the European Communities, Luxembourg.
International Safeguards Data Management System,
F. Argentesi, T. Casilli, L. Costantini, M. G. Dondi, and M. Franklin. c1981, 106p EUR-7580-EN
Portions of this document are not fully legible.
Customers in the European Community countries should apply to the Office for Official Publications of the European Communities, B.P. 1003, Luxembourg.

The features of an international safeguards data management system (ISADAM) developed at JRC-Ispra for Euratom safety accountancy declarations are outlined. The user facilities are described and include data editing analysis of material unaccounted for (MUF), and data query facilities. Details of MUF measurement procedures are given and the different data processing activities involved in loading accounting measurement information into the data base are described. The ISADAM facilities can be developed further to include a wider range of statistical algorithms for MUF time series evaluation and for checking the consistency of the declarations with plant processing logic and advance notice of working plans.

PB82-254483 PC **E04**/MF **E04**
Commission of the European Communities, Luxembourg.
Multidimensional Failure Analysis for LWR with Plutonium Fuel. Part I: PWR (Synthesis Report).
c1981, 68p EUR-7449/I-EN
See also Part 2, PB8-254491.
Customers in the European Community countries should apply to the Office for Official Publications of the European Communities, B.P. 1003, Luxembourg.

The equilibrium cycles of three cores containing different numbers of plutonium fuel assemblies (0%, 37%, 100% MOX-FA) are used in a multidimensional failure analysis. Two failures are investigated: (1) The rupture of a main steam line during stationary, full power operation at the end of a cycle--a higher number of MOX-FA will lead to a higher core power after return to criticality. However no intolerably high fuel and cladding temperatures occur during the incident; and (2) The ejection of a fully inserted control rod at full power--only small excursions of temperatures were seen during the incident; therefore, no cladding or fuel failure is expected. The eventual outcome of the investigated failures is affected only to a small extent by the number of loaded MOX-FA. If less conservative conditions are assumed, the consequences of any failure are likely to be even smaller.

PB82-254491 PC **E04**/MF **E04**
Commission of the European Communities, Luxembourg.
Multidimensional Failure Analysis for LWR with Plutonium Fuel. Part II: BWR (Synthesis Report).
c1981, 73p EUR-7449/II-EN
See also Part 1, PB82-254483.
Customers in the European Community countries should apply to the Office for Official Publications of the European Communities, B.P. 1003, Luxembourg.

Three-dimensional and one-dimensional failure analyses have been carried out for the equilibrium cores with plutonium bundles and compared with the uranium equilibrium cores from the BWR nuclear power station KKI (Isar). The dynamic computations and the comparison between the heterogeneous uranium and plutonium reload cores were performed for four stationary core operating states: (1) equilibrium uranium, beginning of cycle (BOC) and end of cycle (EOC); (2) equilibrium plutonium BOC and EOC. For these operating states the theoretical transients turbine trip and trip of recirculation pumps have been analyzed. The three-dimensional calculations show good agreement. The results of the comparisons between uranium and plutonium equilibrium cores show similar physical behavior. Any differences are due to the effect of the stronger void fraction feedback of the plutonium core.

18K. Reactor Physics

DE81025796 MF **A01**
Oak Ridge National Lab., TN.
Multigroup Covariance Matrices for Fast-Reactor Studies.
J. D. Smith, III, and B. L. Broadhead. Apr 81, 141p ORNL/TM-7389
Contract W-7405-ENG-26
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

This report presents the multigroup covariance matrices based on the ENDF/B-V nuclear data evaluations. The materials and reactions have been chosen according to the specifications of ORNL-5517. Several cross section covariances, other than those specified by that report, are included due to the derived nature of the uncertainty files in ENDF/B-V. The materials represented are Ni, Cr, exp 16 O, exp 12 C, Fe, Na, exp 235 U, exp 238 U, exp 239 Pu, exp 240 Pu, exp 241 Pu, and exp 10 B (present due to its correlation to exp 238 U). The data have been originally processed into a 52-group energy structure by PUFF-II and subsequently collapsed to smaller subgroup strutures. The results are illustrated in 52-group correlation matrix plots and tabulated into thirteen groups for convenience. (ERA citation 07:050315)

DE82010797 MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Fission Rate Assessments in FFTF Using Passive Techniques.
D. W. Wootan, J. A. Rawlins, E. P. Lippincott, L. S. Kellogg, and W. Y. Matsumoto. Oct 81, 22p HEDL-SA-2459, CONF-811103-113
Contract AC06-76FF02170
ANS winter meeting, San Francisco, CA, USA, 29 Nov 1981, Portions of this report are illegible.
Best available copy from document source. Available in microfiche only.

Fission rate assessments are being made in FFTF to provide input for determination of power distribution, peak power, total power, fuel burnup distribution, conversion ration and neutron spectral information by the multiple foil reaction rate method. A goal of the initial FFTF Characterization Program is to measure isotopic fission rates to an accuracy of 2 to 5% throughout FFTF by radiometric techniques. To achieve this goal, measurements were made in the FFTF In-Reactor Thimble to reduce the uncertainties of key parameters needed for radiometric fission rate mapping of the FFTF core. (ERA citation 07:046863)

DE82780427 PC **A03**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Stabsabteilung Internationale Beziehungen.
System of Computer Codes for Neutron Physics Calculation of VVER Reactors.
T. Kulikowska. Dec 80, 32p KFK-tr-658
In German.
U.S. Sales Only.

This paper deals with a system of computer codes calculating the neutron physics for VVER reactors and having been elaborated in the Reactor Calculation Laboratory of the Computing Center of the Nuclear Research Institute at Svierk. (Atomindex citation 12:629749)

PB82-253337 PC **A03**/MF **A01**
Cambridge Univ. (England). Dept. of Engineering.
Neutron Slowing Down Theory.
Final rept.,
J. D. Lewins. c1982, 42p CUED/A-NUCL/TR-2
Also pub. in ISSN-0262-8058.

An elementary theoretical account is given emphasizing a model called continuous slowing down theory. This model is immediately applicable to non-hydrogeneous moderators of thermal reactors, at an acceptable level of approximation, and also provides a conceptual reference for a treatment of slowing down in hydrogen and for better approximations. First, the kinetics of a neutron collision with a moderator and certain average properties of elastic collisons are considered. Then the continuous slowing down model is introduced and discussed. Finally, a brief discussion of slowing down in hydrogen is provided, chiefly to illustrate the deficiencies of the elementary continuous slowing down model.

18L. Reactors (Power)

DE82011511 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Technological Limitations on Nuclear-Electric Space-Power Systems.
A. P. Fraas. 1982, 11p CONF-820228-1
Contract W-7405-ENG-26
Conference on prime power for high-energy space systems, Norfolk, VA, USA, 22 Feb 1982, Portions of this report are illegible.

Different types of space power reactors are compared. Information is presented concerning the choice of fluid circuit structural materials; fuel elements, comparison of one-loop, two-loop, and three-loop systems; reliability of mechanical components; reliability of control systems; zero-g problems; and hazards problems. (ERA citation 07:046879)

19.

ORDNANCE

19A. Ammunition, Explosives, and Pyrotechnics

AD-A117 392/1 PC **A02**/MF **A01**
Army Armament Research and Development Command, Dover, NJ. Fire Control and Small Caliber Weapon Systems Lab.
A More Rational Approach to the Stress Analysis of Projectiles.
Conference paper,
Shih C. Chu, and James Steiner. 18 Jun 82, 13p
Paper from the Proceedings of the Army Sciences Conference (1982), 15-18 Jun 82.

Projectiles are traditionally analyzed and designed by using theory of elasticity. In this approach, the entire projectile body is considered to be loaded within the elastic region. However, under actual firing conditions, the equivalent stress in some region of the projectile is much greater than the yield strength of the projectile material. Hence, plastic flow will be encountered in the projectile body. The present trend in stress analysis of weapon and ammunition components is to take into account, in a more rigorous fashion, the complex phenomena of plastic flow. This is due too the necessity of designing for maximum stress to achieve an optimal design. In this investigation, a more rigorous nonlinear technique is developed in order to predict the inelastic deformation and stress distributions of a projectile subjected to actual firing conditions. Both nonlinear material response and geometric nonlinearity have been taken into consideration. Nonlinearity of material properties has been taken into account by use of theories of plasticity. Geometric nonlinearity has been considered by use of the finite element approach. A complete inelastic stress analysis of a 30 mm XM TP projectile has been conducted. The intent of this investigation is to identify potential design flaws and critical regions of the projectile under actual firing environment.

AD-A117 393/9 PC **A02**/MF **A01**
Army Armament Research and Development Command, Dover, NJ.
Microbial Attack of Nitrocellulose.
Conference paper,
Bruce W. Brodman, and Michael P. Devine. 18 Jun 82, 5p
Paper from the Proceedings of the Army Sciences Conference (1982), 15-18 Jun 82.

The present study is directed toward the use of microorganisms to remove energetic nitrate ester groups from the surface of propellant grains in order to obtain the requisite control of the propellant burning rate. In summary, it has been shown that Aspergillus fumigatus can utilize nitrogen from pyroxylin suspended in a nitrogen deficient medium if a supplementary carbon source is provided. It appears that the organism does not directly attack the nitrocellulose but rather utilizes the nitrogen resulting from the hydrolysis of the nitrocellulose nitrate ester group. Further, it appears that the organism caused enhanced hydrolysis of the nitrocellulose.

AD-A117 564/5 PC **A09**/MF **A01**
Atlantic Research Corp., Alexandria, VA.
Engineering and Development Support of General Decon Technology for the U.S. Army's Installation Restoration Program. Task 2. Literature Review on Treatment of Contaminated Lagoon Sediment.
Final rept. Jun-Nov 80 on Phase 1,
Randall S. Wentsel, Suzette Sommerer, and Judith F. Kitchens. Apr 82, 191p
Contract DAAK11-80-C-0027
See also Task 3, AD-B066 110L.

This report presents a technical and economic evaluation of 8 processes for removal of high concentrations of explosives from contaminated lagoon sediments. The processes evaluated were wet-air oxidation, incineration, molten salts incineration, microwave plasma, high energy electrons, gamma radiation, UV-ozone, UV-peroxide, and chemical degradation. Each process was evaluated for its technical effectiveness, costs, mobility, advantages and disadvantages in application to lagoon decontamination and ability to meet air and water quality standards. (Author)

AD-A117 565/2 PC **A04**/MF **A01**
Atlantic Research Corp., Alexandria, VA.
Engineering and Development Support of General Decon Technology for the U.S. Army's Installation Restoration Program. Task 5. Facility Decontamination.
Final rept. Jun 80-Jul 81,
William E. Jones, Janet Mahannah, Suzette Sommerer, and Judith F. Kitchens. Jul 82, 54p Rept no. 49-5002-0005
Contract DAAK11-80-C-0027
See also Task 6, AD-A110 389.

This report presents a technical evaluation of current and potentially useful methods for decontaminating facilities contaminated with explosives and chemical warfare agents. Several alternative methods were identified as applicable to the problem depending on the contaminant and medium contaminated. (Author)

AD-A117 575/1 PC **A04**/MF **A01**
Army Armament Research and Development Command, Aberdeen Proving Ground, MD. Ballistic Research Lab.
Yawsonde Tests for Prototypes of the 155mm Intermediate Volatility Agent Projectile.
Final rept.,
William P. D'Amico, Jr., and Wallace H. Clay. Jul 82, 52p ARBRL-MR-03185, SBI-AD-F300 057
Supersedes ARBRL-IMR-695 dated Dec 80.

Twelve yawsonde-instrumented, intermediate volatility agent (IVA) projectiles were tested at the BRL Transonic Range facility during August 1980. Two payload designs were tested. These 155mm prototype binary shell utilize a set of tandem, axially aligned canisters. The canisters are of different internal diameters, however. After rupture of the burst discs that separate the canisters, the interior geometry is not a simple cylinder as in the case of the 155mm M687 or the 8-inch XM736 binary projectiles. This unusual interior geometry cannot be easily analyzed for destabilizing effects of the liquid. Data from Charge 4 and 6 launches indicated stable flights for both canister designs. Previous tests at Dugway Proving Ground (DPG) had shown that one of the designs was unstable at Charge 4, but yawsondes were not employed so little information is available as to the nature of the unstable (or stable) flights. Since a reliable mathematical model is not available to aid in the design of the canister IVA configurations, additional testing must be conducted.

AD-A117 593/4 PC **A10**/MF **A01**
City Coll. Research Foundation, New York.
Automated Strength Determination for Involute Fuze Gears.
Contractor rept.,
Gerard G. Lowen, and Clifford Kaplan. Feb 82, 212p
ARLCD-CR-81060, SBI-AD-E400 788
Contract DAAK10-79-C-0251
Project engineer: Frederick Tepper.

This investigation developed two computer programs which allow the determination of the tooth profile coordinates, together with the associated Lewis gear strength and AGMA geometry factors, for all types of involute gears including fuze gears. These two programs differ only in the manner in which the root portion of the teeth is obtained. The origins of the involute and trochoid coordinate expressions and of all programming schemes are discussed in detail. Sample runs and operating instructions are provided.

AD-A117 688/2 PC **A04**/MF **A01**
Army Armament Research and Development Command, Dover, NJ. Large Caliber Weapon Systems Lab.
Evaluation of Continuous-Cast Steel for Projectile Bodies.
Final rept. 1974-1976,
Charles E. Sallade. Apr 82, 60p ARLCD-TR-81016, SBI-AD-E400 808

A quantity of 105-mm M1 projectile bodies was made from continuous-cast steel to determine the suitability of this steel for manufacture of 105-mm projectile bodies. The hot cup-cold draw forming process was used to evaluate both hot and cold forming characteristics. A metallurgical evaluation of this steel was also performed. Continuous-cast steel with a reduction in area of at least 4:1 was determined to be suitable for manufacture of projectile bodies.

AD-A117 694/0 PC **A03**/MF **A01**
Materials Research Labs., Ascot Vale (Australia).
Influence of HNS on the Microstructure and Properties of Cast TNT,
M. A. Parry, and B. W. Thorpe. Apr 81, 34p Rept no. MRL-R-812

The influence of the additive 2,2',4,4',6,6'-hexanitrostilbene (HNS) on the physical properties of cast 2,4,6-trinitrotoluene (TNT) has been studied. As little as 0.3% HNS incorporated by the cycle-cast technique effects exceptional grain modification of the TNT, with an associated fourfold increase in strength. The same grain modification and increase in mechanical strength were achieved by the addition of pre-produced (TNT)2HNS complex to TNT at 90 C, and was unaffected by holding at that temperature for up to 4 h before casting. The simple inclusion of HNS caused a minor modification of the grain structure of TNT castings and a smaller increase in their mechanical strengths. These results are consistent with the inferior nucleation efficiency of HNS compared with the (TNT)2HNS complex. (Author)

AD-A117 695/7 PC **A03**/MF **A01**
Materials Research Labs., Ascot Vale (Australia).
Explosives Instrumentation Group Trial 6/77-Propellant Fire Trials (Series Two).
Technical note,
I. J. Walters, and A. V. Pleckauskas. Oct 81, 38p Rept no. MRL-TN-457

A series of fire trails were carried out for the Operational Safety Committee to determine the effect of packaging and containerization on the hazard categorization of AR5401, and by similarity AR2201, when those propellants are subjected to a fuel fire as may be experienced when transported on board ship. (Author)

AD-A117 698/1 PC **A02**/MF **A01**
Materials Research Labs., Ascot Vale (Australia).
A 'C'-Shaped Fracture Toughness Specimen from the Wall of a 5-in./54, Mk 64, Naval Projectile.
Rept. for Jan 79-Nov 80,
D. S. Saunders. Oct 81, 22p Rept no. MRL-R-831

This Report examines the suitability of a 'C'-shaped specimen configuration for the measurement of the fracture toughness of an artillery projectile manufactured from a high fragmentation steel. For this investigation a conventional shell steel, taken from the Australian 5-in./54 HE naval projectile, has been heat treated to fracture toughness states approximately corresponding to those of the new-generation steels used in high fragmentation projectiles. The practical aspects of specimen preparation and testing have been assessed in this work. (Author)

AD-A117 932/4 PC **A02**/MF **A01**
Army Test and Evaluation Command, Aberdeen Proving Ground, MD.
Recovery of Fired Ammunition.
Final rept.
3 Aug 82, 23p
Supersedes report dated 1 Feb 74, AD-777 919.

Describes techniques for recovering ammunition fired as follows; vertically (83 degrees to 90 degrees weapon elevation); at long range into a prepared field and into water; point blank into sawdust, sand, or Celotex; at low velocity at a cloth target; by parachute; by long-tube/compressed air; and by water-rail deceleration. Applies to mortar, recoilless rifle, tank, field artillery, and anti-aircraft artillery ammunition. Excludes rocket warheads, missiles, and small arms projectiles. (Author)

DE82009047 MF **A01**
Mound Facility, Miamisburg, OH.
Utilization of Accelerating Rate Calorimetry for the Characterization of Energetic Materials at MRC-Mound.
J. M. Pickard. 1982, 13p MLM-2912(OP), CONF-820518-3
Contract AC04-76DP00053
Joint symposium on compatability of plastics and other materials with explosives, Phoenix, AZ, USA, 30 May 1982.
Available in microfiche only.

The technique of Accelerating Rate Calorimetry (ARC) was used to investigate the thermal stabilities of energetic materials used in production and manufacturing at MRC-Mound. Plots of heat rate versus temperature, along with temperature and pressure versus time plots, were determined for selected secondary explosives and one model compound. Analyses of these data were used to derive zero-order kinetic parameters, time-to-explosion plots, and approximate critical explosion temperatures.

DE82009724 PC **A02**/MF **A01**
Mason and Hanger-Silas Mason Co., Inc., Amarillo, TX.
Determination of the Nitrogen Content of Nitrocellulose.
B. R. Richardson. Mar 82, 9p MHSMP-82-12
Contract AC04-76DP00487

A procedure for separating nitrocellulose from PBX 9404 and its subsequent analysis for nitrogen content is discussed. Nitrogen analysis of nitrocellulose on a Perkin-Elmer Model 240 elemental analyzer yielded results about 1% absolute from the percentage of nitrogen in the nitrocellulose. Several samples were analyzed in replicate; a correlation between age and nitrogen content can be made. (ERA citation 07:044599)

DE82012577 PC **A02**/MF **A01**
Mason and Hanger-Silas Mason Co., Inc., Amarillo, TX.
Water-Aminated TATB Factorial Studies.
R. W. Ashcraft, and W. T. Quinlin. Apr 82, 13p MHSMP-82-15
Contract AC04-76DP00487
Portions of document are illegible.
Microfiche only after original copies are exhausted.

This report contains the analyses of two factorial experiments on the water-amination of TATB. The first experiment was done with a single baffle configuration for the reactor. Process variables were TCTNB concentration, reactor stirring rate, and ammonia flow rate. The second experiment was done with a double baffle configuration and the same process variables. For both experiments, the measurement variables were three particle size parameters derived from sieve analysis. TCTNB concentration was found to be the most important variable affecting particle size. Material produced in the double baffle configuration showed less variation in particle size than that produced in the single baffle configuration. (ERA citation 07:044600)

PAT-APPL-6-333 607 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Retainer for a Projectile Rotating Band.
Patent Application,
Abner Buckner Price, and William Samuel Burnley.
Filed 23 Dec 81, 9p AD-D009 561/2
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The patent application discloses a retainer for attaching a rotating band to a projectile during handling and ramming of the projectile. The retainer cooperates with a groove on the projectile and is discarded during firing of the projectile by the force of the charge. An interlocking double split ring forms the retainer with an outer ring having an L-shaped cross-section and an inner ring shaped to fit into the L-shaped of the outer ring. Each ring is provided with a split or opening to allow for expansion of the ring over the projectile and into the projectile groove. The outer ring split may be cut at an angle of less than 90 degrees to minimize deflection of the outer ring. The inner and outer rings are assembled with their splits together and then clocked 180 degrees apart. The inner ring is then locked to the outer ring by a locking notch. Hoop stress of the outer ring prevents the inner ring from deflecting at the split such that the retainer is forced to behave as a continuous single ring. (Author)

PAT-APPL-6-370 232 PC **A02**/MF **A01**
Department of the Air Force, Washington, DC.
Detonator Block.
Patent Application,
Bruce B. Jones. Filed 21 Apr 82, 17p AD-D009 572/9
Portions of this document are not fully legible.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The patent application describes a detonator block which permits the explosion of a primary detonator and the resultant explosion of an associated primary detonating cord, but which at the same time prevents damage to or explosion of an adjacent secondary detonator and its associate secondary detonating cord. (Author)

PATENT-4 300 389 Not available NTIS
Department of the Army, Washington, DC.
Soft Recovery Method for Gunfired Shells.
Patent,
Frank L. Tevelow. Filed 6 Jun 80, patented 17 Nov 81, 5p AD-D009 546/3, PAT-APPL-6-157 145
Supersedes PAT-APPL-6-157 145, AD-D007 897.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An apparatus and method for soft recovery of a projectile is disclosed. An element, at least a portion of which is deformable, is placed in the path of the projectile, whereby the projectile becomes embedded in the element upon impact therewith. Gravitational or aerodynamic forces are applied to the combined projectile and deformable element to decelerate the same thereby making recovery possible. (Author)

PATENT-4 310 760 Not available NTIS
Department of the Army, Washington, DC.
Optical Fuze with Improved Range Function.
Patent,
Leland V. Gardner. Filed 27 May 80, patented 12 Jan 82, 5p AD-D009 537/2, PAT-APPL-6-153 462
Supersedes PAT-APPL-6-153 462, AD-D007 900.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington DC 20231 $0.50.

An optical proximity fuze is disclosed which has an improved response at close range with respect to a target. The fuze comprises a source of infrared radiation or visible light which is projected toward the target, and a receiver or detector which responds to radiation reflected from the target. An opaque field stop in front of the detector comprises multiple apertures for permitting only selected portions of the reflected radiation to reach the detector. The use of multiple apertures, rather than a singular large aperature, improves short range response of the fuze without increasing sensitivity of the fuze to aerosols.

19C. Combat Vehicles

AD-A117 834/2 PC **A10**/MF **A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS. Geotechnical Lab.
Steerability Analysis of Tracked Vehicles on Soft Soil; Theoretical Predictions Versus Field Measurements.
Final rept.,
Behzad Rohani, and George Y. Baladi. Jun 82, 215p
Rept no. WES/TR/GL-82-4

In 1978, a terrain-vehicle interaction model was developed by the authors for predicting the steering performance of high-mobility/agility tracked vehicles in environments ranging from very soft soils to hard surfaces. To validate the accuracy of the model for predicting the steering performance of tracked vehicles on soft soils, circular-turn tests were conducted at two sites on a floodplain north of Redwood, Mississippi, and on a dredged spoil area within the WES reservation at Vicksburg, Mississippi. A number of in situ direct shear tests were conducted at each test site and the results used to fit a mathematical soil model with a rate-dependent nonlinear failure envelope for input to the tracked vehicle prediction model. Thirty-five circular-turn tests were conducted at the three test sites, but due to instrumentation problems, complete data were collected for only 16 tests at the Redwood sites. Results from these 16 'good tests' were used to validate both the steady-state and the transient versions of the model.

AD-A117 927/4 PC **A02**/MF **A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS.
Armored Combat Vehicle Technology (ACVT) Program Mobility/Agility Findings.
Conference paper,
Newell R. Murphy, Jr. 18 Jun 82, 15p
Paper from the Proceedings of the Army Sciences Conference (1982), 15-18 Jun 82.

The ACVT program was a joint Army and Marine Corps project to develop technology for designing and building armored vehicles in the post-1985 time frame. This paper is concerned only with the mobility and agility part of the program, which consisted of three closely related activities: Careful testing of two special test chassis, plus the General Motors XM1 automotive test rig (ATR), the M113A1 Armored Personnel Carrier (APC), and the M60A1 Main Battle Tank (MBT), to develop quantitative data relating various measures of performance to a wide range of vehicle design parameters and terrain conditions and to driver behavior; Development or refinement of analytical models for predicting vehicle performance, and validation of these models, and Use of the validated analytical models to conduct broad parametric studies, to support war games which integrated mobility/agility, weapon systems, and armor considerations, and to evaluate concept designs for lightweight combat vehicles based on present and near-future component technology.

19D. Explosions, Ballistics, and Armor

AD-A117 402/8 PC **A03**/MF **A01**
Teledyne Geotech, Alexandria, VA. Seismic Data Analysis Center.
Analysis of Techniques for Application of Magnitude Corrections Developed by Marshall, Springer, and Rodean.
Technical rept.,
Robert R. Blandford, and Zoltan A. Der. 12 Nov 81, 41p SDAC-TR-81-13, VSC-TR-82-5
Contract F08606-79-C-0007, DARPA Order-2551

Analysis of the procedures recommended by Marshall, Springer and Rodean (1979) for correction of explosion magnitude due to pP and absorption shows that the techniques are needed and are generally satisfactory. However, the pP correction could be made more accurate and operationally applicable, and the absorption correction needs further checking and perhaps a different approach. A new attack on the general problem is recommended in order to properly treat problems of focusing-defocusing, crustal amplification, clipping and noise data, and pP and absorption as mentioned above.

AD-A117 426/7 PC **A02**/MF **A01**
Army Armament Research and Development Command, Dover, NJ.
The Shock Front Rise Time in Water.
Conference paper,
Paul Harris. 18 Jun 82, 13p
Paper from the Proceedings of the Army Sciences Conference (1982), 15-18 Jun 82.

This paper reports on successful shock front optical reflectivity theory and experiment for water at 5.8 kbar (0.58 GPa), and complimentary shock induced electrical polarization experiment and theory for the pressure range 20 kbar to 100 kbar. The LCWSL - Universite de Poitiers program has experiments performed in France (funded by the Commission Nationale Recherche Scientique), while the ILIR program within the LCWSL funds the theoretical work. The consistent interpretation of the reflectivity and shock polarization results is (a) a shock front rise time of approximately 10-12 sec throughout the pressure range of 0 to 100 kbar, (b) a transition in the source of the dominant polarization voltage to the alignment of unbonded dipole moments at approximately 35 kbar, and (c) in the unbonded

region the average contributing dipole is perfectly aligned in the direction of shock propagation.

AD-A117 436/6 PC **A05**/MF **A01**
Science Applications, Inc., McLean, VA.
Nuclear Air Blast Effects.
Final rept. 1 May 81-30 Apr 82,
Mark Fry. Jun 82, 98p Rept no. SAI-83-836-WA
Contract N00014-81-C-2267

The accomplishments achieved over the contract period are documented. Computational results for nuclear and conventional airblast are presented. Improvements in the numerical algorithms are discussed. Theoretical computation of shock waves is compared with available data. (Author)

AD-A117 571/0 PC **A07**/MF **A01**
Falcon Research and Development Co., Baltimore, MD.
Analysis of Modulated Oscillator Data.
Contract Rept.,
R. S. Bennett, N. E. Aldridge, and M. E. Delkhoon.
Jul 82, 148p ARBRL-CR-00483, SBI-AD-F300 062
Contract N00123-77-C-0549

A numerical data analysis technique which permits the evaluation of time series recorded by a radio frequency oscillator measurement system mounted at the gun muzzle is described. The report briefly outlines the measurement method and describes in detail the requirements on the data analysis, the analysis methodology, the developed computer program and its opteration.

AD-A117 710/4 PC **A02**/MF **A01**
Army Tank-Automotive Command, Warren, MI.
Characterization of Adhesively Bonded Aluminum Armor through Qualitative Analytical Techniques.
Final rept. Jul 81-Mar 82,
M. J. King, T. J. Kler, and D. T. Ostberg. Apr 82, 17p
Rept no. TACOM-TR-12648

Aluminum armor 5083, single lap shear coupons were joined with generic epoxy and urethane adhesive to determine the adhesive effectiveness. Chemical treatment of the aluminum substrate with Methyl Ethyl Ketone (MEK) was also examined to determine its effect on the shear strength. The tests were conducted under atmospheric pressure and a temperature of 70 degrees + or - 5 degrees F. Shear strength results indicate that, when applied to an untreated or MEK treated surface with a 60 + or - 10 microns inch finish, both epoxy and urethane are unacceptable for aluminum armor 5083 bonding. (Author)

AD-A117 849/0 PC **A02**/MF **A01**
Naval Research Lab., Washington, DC.
A Study of Detonation Structure: The Formation of Unreacted Gas Pockets.
Interim rept.,
E. S. Oran, T. R. Young, J. P. Boris, J. M. Picone, and D. H. Edwards. 26 Jul 82, 18p Rept no. NRL-MR-4866

Schlieren photographs of detonations in low pressure H2-O2-Ar mixtures and numerical simulations of propagation detonations have revealed the presence of unreacted pockets of gas behind the shock front - Mach stem structure. These pockets are completely surrounded by burned gas, and they in turn burn more slowly, finally giving their energy to the system. Two-dimensional numberical simulations performed to study the development of unburned pockets show that they are peninsulas of cooler material cut off by the collision of two Mach stems or of a Mach stem and the wall. Their presence is observed when there is sufficient decoupling of the reaction zone from the incident shock. These unreacted gas pockets and the associated long induction distance are discussed in terms of possible mechanisms for cell reinitiation, cell generation, and the behavior of detonations near the detonation limits. (Author)

DE82008489 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Characterization of the Shock Attenuation Properties of Lightly Compacted Damp Earth.
G. W. Dyckes. Aug 81, 15p SAND-81-1853
Contract AC04-76DP00789
Portions of this report are illegible.

The shock-mitigating properties of lightly compacted damp alluvium placed over hemispherical surface charges of composition C-4 explosive are described. Small air cavities surrounding the explosive did not have a significant effect on the recorded pressures in the earth at distances greater than 3 ft. Exponential and power functions derived from the pressure data were consistent with the scaling function, R = 6.6W/ sup 1/3/, used for determining the earth thickness required to contain the explosive. (ERA citation 07:051405)

19E. Fire Control and Bombing Systems

PATENT-4 306 806 Not available NTIS
Department of the Army, Washington, DC.
Gun Tube Orientation Sensor; Target Mirror.
Patent,
Morton A. Barron. Filed 20 Sep 79, patented 22 Dec 81, 7p AD-D009 552/1, PAT-APPL-6-077 441
Supersedes PAT-APPL-6-077 441, AD-D007 468.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Disclosed is an apparatus useful for obtaining mutual angular alignment of two remotely positioned objects about three orthogonal axes. The apparatus comprises essentially a collimated light source associated with one of the two objects, a prism associated with the other of the two objects, and a viewing screen or device for viewing images created by the light source and the prism. The face of the prism is partially reflective and partially transmissive of light received the light source, whereby the image projected by the light source is split into two distinct images by the prism. Together, the two images give an indication of the relative orientations of the two objects about three mutually orthogonal axes. The apparatus is useful for detecting and correcting changes in the orientation of a gun tube after firing. It is also useful for obtaining precise alignment of tools or precision manufacturing equipment. (Author)

19F. Guns

AD-A117 687/4 PC **A04**/MF **A01**
Army Armament Research and Development Command, Dover, NJ. Technical Support Directorate.
Universal Turret System Model Determination and Controller Performance Testing.
Final rept. Oct 80-May 81,
G. A. Strahl, and R. A. Peterson. Apr 82, 73p
ARTSD-TR-81005, SBI-AD-E400 809

Objectives of the testing were to obtain necessary data to determine a valid mathematical model for a universal turret system and to test the performance of optimal turret controllers designed and built for the UTS using that model. Two distinct test phases were conducted: the model determination and the controller performance testing. First, the model determination testing is reported, including turret preparation, test plan preparation and modification, and test execution. Then, the optimal controller design and performance testing is covered. Results of both firing and nonfiring tests are reported and analyzed. The frequency response (Bode) plots are compared to derived theoretical results. The UTS optimal controller performance is compared to the performance of the UTS original controller and of the prototype XM97 controllers tested in a previous program by the use of statistical analysis technique.

PAT-APPL-6-375 797 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Small Arms Firing Effects Simulator.
Patent Application,
Christopher R. Dawson, and Ronald E. Purkis. Filed 7 May 82, 15p AD-D009 576/0
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The present invention represents a cost effective means for simulating small arms fire without modifying the weapon and without the use of mechanical actuation, other than in electrical switches. The present invention utilizes a low cost plastic expendable housing a metal/oxidizer pyrotechnic in conjunction with an electrical ignition system. The expendable would contain a plurality of rounds and would be installed in a firing unit which can be inserted into the weapon via the magazine breech. The invention produces sound and flash by the electrical ignition of the pyrotechnic in a confined space and venting the combustion produced in a manner which utilizes the weapon's ejection port. The electrical control circuit provides for automatic and semiautomatic fire, and interfaces with the weapon trigger and bolt.

19G. Rockets

AD-A117 395/4 PC **A02**/MF **A01**
Military Academy, West Point, NY.
Multiple Launch Rocket System (MLRS) Fuze.
Conference paper,
John J. Bertin, and Richard L. Goodyear. 18 Jun 82, 12p
Paper from the Proceedings of the Army Sciences Conference (1982), 15-18 Jun 82.

This analysis showed that pressures measured at the inlet hole to the fluidic generator are in close agreement with those given by normal shock relations. Over the external surface of the ogive, the ratio of local static pressure to stagnation pressure measured at the nose, p/p(t2) decreased as the free stream Mach numbers increased. Within this trend existed regions of expansion and compression which were a result of the ogive's geometry and the injection of the air exhausted from the fluidic generator. Theoretical models predicted reasonably well the dependence on Mach numbers of p/p(t2) as well as the relative values of p/p(t2) at different points on the ogive. Pressures measured at the entrance and exit of the region occupied by the generator permitted calculation of the mass flow rate through the fuze. This analysis verified that the key factors that should be duplicated in laboratory tests were the pressures at the generator's entrance and at the exhaust ports in the ogive; but the most significant result was the accumulation of a data base of the actual pressures to be associated with desired combinations of Mach number and altitude. Consequently, the high altitude chamber proposed to test MLRS fuzes has been incorporated into the product specification and used with confidence in the quality assurance program of the contractor.

19H. Underwater Ordnance

PATENT-4 323 025 Not available NTIS
Department of the Navy, Washington, DC.
Torpedo Steering Control System.
Patent,
Seth G. Fisher, and Stephen Kowalyshyn. Filed 7 Mar 61, patented 6 Apr 82, 7p AD-D009 556/2, PAT-APPL-094 095
Supersedes PAT-APPL-094 095-61.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This invention concerns an improved system for renewing target search action of the torpedo in the event of target echo loss during a pursuit phase, in particular a search action of unique type which yields high probability of target re-acquisition. Specifically, this system first effects circling of the torpedo in target search condition for a predetermined period at substantially the torpedo depth at which target echo loss occurred, an action here termed flat circle search, then effects helical search action in which the torpedo sweeps or scans a volume extending between predetermined search ceiling and search floor depths. Further, in accordance with the present invention, there is provided a depth steering apparatus for stably maintaining the torpedo at substantially constant depth, as during flat circle search, wherein the depth steering apparatus is controlled by both depth rate and pitch rate sensors.

20. PHYSICS

20A. Acoustics

AD-A117 370/7 PC **A02**/MF **A01**
John Carroll Univ., Cleveland, OH. Dept. of Physics.
Studies of the Propagation of Elastic Waves in Fluids and Solids.
Summary rept. 1 Dec 74-30 Apr 82,
E. F. Carome. 1 May 82, 16p
Contract N00014-75-C-0247

During the seven and a half year period 1 December 1974 to 30 April 1982 the Acoustics Branch of the Office of Naval Research partially supported an extensive physical acoustics research program in the Department of Physics of John Carroll University. The long range goals of this program, some of its accomplishments, and various research projects that have been conducted with ONR support are outlined in this report. Also included are a list of publications resulting from the contract research and a list of graduate students who have participated in the program, together with titles of their theses.

AD-A117 654/4 PC **A02**/MF **A01**
California Univ., San Diego, La Jolla. Inst. of Geophysics and Planetary Physics.
Application of the WKBJ Green's Function to Acoustic Propagation in Horizontally Stratified Oceans,
Michael G. Brown. 13 Jul 81, 7p
Contract N00014-80-C-0217
Pub. in Jnl. of the Acoustical Society of America, v71 n6 p1427-1432 Jun 82.

No abstract available.

AD-A117 662/5 PC **A02**/MF **A01**
Naval Underwater Systems Center, New London, CT. New London Lab.
Doppler Spectra of Sea-Surface Backscatter at High Acoustic Frequencies.
Technical document,
W. L. Konrad, D. G. Browning, and R. H. Mellen. 1 Jul 82, 14p Rept no. NUSC-TD-6735
Paper Presented at the Meeting of the Acoustical Society of America (103rd), 26-30 Apr 82, Chicago, IL.

The initial transfer of energy from atmospheric wind to the ocean surface, which would be a significant factor in ambient noise, may occur via the so-called Cat's Paw phenomena. To study this effect, an experiment was conducted at Seneca Lake for a moderately disturbed (no whitecaps) air-water interface. Doppler spectrum measurements of high-frequency acoustic waves backscattered from the wind-driven water surface indicate the presence of small-scale roughness that is convected downward by surface drift. For a slightly rippled surface, there is a sharp resonant peak corresponding to a convection velocity of approximately 0.4 m/s which is nearly independent of wind speed. The spectrum is broadened by phase modulation due to the orbital motion of large-scale gravity waves but remains skewed in the downwind direction. (Author)

AD-A117 701/3 PC **A06**/MF **A01**
Naval Underwater Systems Center, New London, CT. New London Lab.
IFD: An Implicit Finite-Difference Computer Model for Solving the Parabolic Equation.
Technical rept.,
Ding Lee, and George Botseas. 27 May 82, 104p Rept no. NUSC-TR-6659

A general purpose computer model, based on the implementation of an implicit finite-difference scheme, is developed for the solution of the parabolic wave equation. This model can be used to predict acoustic propagation loss in both range-independent and range-dependent environments. An important feature of the model is that it can handle arbitrary surface boundary conditions and an irregular bottom with arbitrary bottom boundary conditions. In the event that the bottom boundary conditions cannot be expressed mathematically, the model has the capability of introducing an artificial absorbing bottom such that, with the appropriate bottom attenuation, the problem becomes solvable. Another important feature of the model is that it can handle horizontal interfaces of layered media. The model is easy to use and easy to modify. Numerical test examples are included to demonstrate the capabilities of the model. (Author)

AD-A117 767/4 PC **A08**/MF **A01**
Pennsylvania State Univ., State College. Applied Research Lab.
Investigation into Bias Errors of the Two-Microphone Cross-Spectral Method to Measure Acoustic Intensity.
Master's thesis,
Paul D. Kiteck. 2 Jun 82, 163p Rept no. ARL/PSU/TM-82-135
Contract N00024-79-C-6043

The practical application of the two-microphone cross-spectral method of measuring acoustic intensity has recently gained great popularity in the field of noise control and soon will become the standard method of measuring the sound power of a noise source in-situ. The cross-spectral intensity technique contains inherent limitations which must be thoroughly understood before applying the measuring method in the field. These errors of the cross-spectral intensity method can be classified in terms of both bias and random errors, and if the coherence between the two receivers approaches unity and the random errors are sufficiently reduced by an appropriate amount of averaging by the FFT analyzer, the bias errors are then considered to be the major contributor to the deficiencies of the two-microphone intensity technique. These bias errors of the cross-spectral intensity technique have been theoretically analyzed in the literature but not completely verified experimentally. Therefore, the purpose of this work is to experimentally investigate the bias errors of the cross-spectral method of measuring acoustic intensity and also provide a current review of the technique. (Author)

AD-A117 802/9 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Experimental and Theoretical Analysis of Temperature Dependence of Wideband SAW RAC Devices on Quartz.
Journal article,
Don M. Boroson, and Daniel E. Oates. 1981, 6p MS-5751, ESD-TR-82-031
Contract F19628-80-C-0002
Pub. Proceedings of the Ultrasonics Symposium, p38-443 1981.

No abstract available.

AD-A117 847/4 PC **A02**/MF **A01**
Texas Univ. at Austin. Applied Research Labs.
On the Current Status of Theoretical Modeling of Acoustic Waves in Saturated Sediments.
Technical rept.,
Anthony Bedford. Jun 82, 14p Rept no. ARL-TR-82-32
Contract N00014-76-C-0117

A brief, critical discussion is given of efforts to develop theoretical models for wave propagation in saturated marine sediments. The modeling of propagation in unbounded media is considered as well as the problem of wave reflection at the water/saturated sediment interface. It is concluded that, while important and substantial process has been made, much work remains, particularly with regard to the characterization of the viscoelastic properties of sediments at low frequencies.

AD-A117 907/6 PC **A06**/MF **A01**
Georgetown Univ., Washington, DC. Dept. of Physics.
An Analytical Solution to the Problems of Three-Phonon Interaction and Second Harmonic Generation in a Solid Plate.
Technical rept.,
Tai San Chao. Aug 82, 101p Rept nos. GUUS-08825, TR-5
Contract N00014-78-C-0584

A Green's function approach is used to determine the conditions under which it is possible to generate second harmonics of Lamb waves on solid plates and to have two Lamb waves interact to produce a third phonon (another Lamb mode). (Author)

PAT-APPL-6-364 098 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Calibration Method for Acoustic Scattering Measurements Using a Spherical Target.
Patent Application,
L. R. Dragonette. Filed 31 Mar 82, 21p AD-D009 566/1
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This abstract discloses a method for calibrating acoustic backscattering instrumentation utilizing a spherical body as a standard target. A spherical body made of high specific acoustic impedance material, such as tungsten carbide, is positioned a given distance from a source/receiver transducer which is energized to produce a short acoustic pulse directed toward the sphere. Acoustic signals reflected from the sphere are detected by the transducer and processed in time domain to separate the rigid portion of the return from the elastic portions. The rigid portion is corrected for the transducer to sphere distance, the reflectivity of the sphere, and for the radius of the sphere. The resultant corrected signal represents the incident acoustic pulse produced by the transducer.

20B. Crystallography

AD-A117 401/0 PC **A02**/MF **A01**
Army Materials and Mechanics Research Center, Watertown, MA.
Resolution of Factors Responsible for Difficulty in Growing Single Crystals of YAG.
Conference paper,
Jaroslav L. Caslavsky, and Dennis J. Viechnicki. 18 Jun 82, 8p
Paper from the Proceedings of the Army Sciences Conference (1982), 15-18 Jun 82.

The enhanced formation of the scattering centers in Nd:YAG is attributed to the fact that the melting point of YAG is 170 deg C lower than the melting point of NdA103. Further, since aluminium ions in the neodyium aluminate are present in six-fold coordination NdA103 can easily nucleate near the solid-liquide interface where lower temperature favors reaction (1). Provided that the growth rate of Nd:YAG exceeds the kinetics of reaction (2), the second phase particles will precipitate in the growing Nd:YAG crystal and appear as scattering centers. From the experimental evidence it can be concluded that in the composition section on and near the tie line connecting NdA103 and Y3A15012 in the Nd203-Y203-A1203 ternary system, NdA103 shows an inherent property to nucleate first. To eliminate the nucleation of Nd103 during the crystal growth of Nd:YAG the thermal gradient near the solid-liquid interface has to be very steep while the melt temperature has to be kept above the temperature which prevents reaction (1). Simultaneously the speed of the interface advancement has to be set below the thermally induced flow of the melt from the solid-liquid interface. Therefore, it is apparent that with the correct growth conditions scattering center free Nd:YAG single crystals can be grown by VSOM. (Author)

AD-A117 494/5 PC **A03**/MF **A01**
Harry Diamond Labs., Adelphi, MD.
Charge Penetration Effects in Rare-Earth Crystal Fields.
Technical rept.,
Clyde A. Morrison. Jun 82, 31p Rept no. HDL-TR-1990

The theory of charge penetration by a rare-earth ion into the charge distribution on a ligand has been developed. The results are cast into a form reminiscent of the Sternheimer shielding factors, sigma n, which relate the observed A prime nm < r to the nth power > to the lattice sum A nm < r to the nth power > in the form A prime nm < r to the nth power > = A prime nm < r to the nth power > (1 - sigma n). The corresponding form developed here is A prime nm < r to the nth power > = A prime nm < r to the nth power > (1 - delta n(x,y)/< r to the nth power >) with explicit expressions given for the delta n(x,y). The delta n(x,y)

is then expanded for small x, and a form convenient for calculation is given. The results obtained here can be used with the three-parameter theory of crystal fields to obtain crystal field parameters Bnm (tau;q eta gamma), which give a better representation of the phenomenological Bnm than we obtained previously. (Author)

AD-A117 507/4 PC **A05**/MF **A01**
Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.
Growth and Characterization of In(1-x)Ga(x)As(y)P(1-y) and GaAs Using Molecular Beam Epitaxy.
Final rept. 9 Feb 79-30 Sep 81,
G. D. Holah, E. L. Meeks, F. L. Eisele, and D. W. Covington. Feb 82, 85p Rept no. GIT/EES-A-2291
Contract N00173-79-C-0033

This report describes the technical accomplishments of a two-year basic research program directed towards a study of GaAs and the quaternary III-V alloy system, In(1-x)Ga(x)As(y)P(1-y), grown by molecular beam epitaxy (MBE). Layers suitable for application of these materials, together with related binary and ternary systems, to microwave, millimeter and optical devices were targeted. Doping profiles in GaAs which are difficult to produce by techniques other than MBE and which potentially offer enhanced characteristics for specific GaAs microwave and millimeter wave devices have been produced. InAs layers grown on InGaAs buffer layers have exhibited electron mobilities exceeding 30,000 cm(2)V(-1)s(-1) at 77 deg K. InP layers have been grown and analyzed using photoluminescence which demonstrated the existence of iron outdiffusion from the Fe-doped InP substrate. InGaAs layers grown in a heterostructure FET system showed an improvement in electron mobilities over those of GaAs FETs grown under similar conditions.

AD-A117 524/9 PC **A03**/MF **A01**
Amorphous Materials, Inc., Garland, TX.
Large Plate CdTe Synthesis by Sealed Vessel Transport.
Quarterly technical rept. no. 2, 1 May-30 Jun 82,
A. R. Hilton. Jul 82, 35p Rept no. AMI-008
Contract MDA903-82-C-0159, ARPA Order-4383

The second quarterly report for the program to grow large plates of CdTe by vapor transport in a sealed system covers the period May-June, 1982. Altogether 14 attempts have been made to compound CdTe and then transport the material into a separate plate chamber. Plates 6" in diameter have been formed only twice. Progress has been hampered by quartz failure believed due to attack by cadmium vapor. Failure to transfer is believed to be due to deviation from stoichiometry and plugging of the transfer tube between the two chambers. A process change planned for next quarter should eliminate these problems. (Author)

AD-A117 724/5 PC **A02**/MF **A01**
Rutgers - The State Univ., New Brunswick, NJ. Dept. of Mathematics.
Monte Carlo Studies of an FCC Ising Antiferromagnet with Nearest- and Next-Nearest-Neighbor Interactions,
M. K. Phani, Joel L. Lebowitz, and M. H. Kalos. 18 Oct 79, 10p AFOSR-TR-82-0598
Grant AFOSR-78-3522
Pub. in Physical Review B, v21 n9 p4027-4035, 1 May 80.

No abstract available.

AD-A117 752/6 PC **A03**/MF **A01**
Rockwell International, Thousand Oaks, CA. Science Center.
Growth of HgCdTe by Modified Molecular Beam Epitaxy.
Semi-Annual technical rept. no. 5, 1 Sep 81-28 Feb 82,
J. T. Cheung. 15 Jun 82, 33p Rept no. SC5202.17SA
Contract MDA903-79-C-0188, DARPA Order-3704

Films of Hgl-xCdxTe and ZnO can be formed by the LADA technique. Their results will be presented separately. HgO.7CdO.3Te films have specular surface morphology and sharp interfaces with a cross diffusion region of 1500 A. Electron mobility at 77K as high as 19,000 sq cm/V-s was observed. SIMS profile analysis indicated large accumulation of impurities at the interface and near the surface, MIS devices were fabricated and their results will be presented. ZnO films can be formed by evaporating from ZnO powder pellets with a pulsed carbon dioxide laser (lambda = 10.6 micrometers). Films from 0.1 to 1.0 micrometers thick were deposited on various substrates in a wide range of temperatures. At substrate temperatures above 250 C, the deposited films are colorless and transparent. The surface is smooth with no discernable features, even under 1000x magnification. The films are highly oriented along the C-axis. X-ray diffraction patterns indicate a single (0001) peak with a half width (2 theta) about 0.3-0.35 degrees. This is comparable to the ZnO films deposited by the state-of-the-art magnetron sputtering technique.

AD-A117 884/7 PC **A02**/MF **A01**
Wright State Univ., Dayton, OH. Dept. of Physics.
Radiation Damage and Annealing Effects Studies of Silicon-Implanted Gallium Arsenide.
Final rept. Apr-Dec 81,
Samuel C. Ling. 31 Mar 82, 15p AFOSR-TR-82-0618
Grant AFOSR-81-0101

Radiation damage and low temperature (200 degrees-600 degrees C) annealing behavior of 120 keV silicon and selenium ion implants into gallium arsenide have been investigated by Rutherford Backscattering-Channeling and Transmission Electron Microscopy techniques. Lattice location studies of Si implants after high temperature annealing (850 degrees and 950 degrees C) have been conducted using Proton Induced X-Ray Emission method. (Author)

20C. Electricity and Magnetism

AD-A117 504/1 PC **A02**/MF **A01**
Illinois Univ. at Urbana-Champaign. Electromagnetics Lab.
An Analytical Investigation of Fin Lines with Magnetized Ferrite Substrate.
Technical rept.,
Y. Hayashi, and R. Mittra. Jun 82, 22p UIEM-82-4, UILU-ENG-82-2542, ARO-18054.1-EL
Contract DAAG29-82-K-0084

This paper presents an analysis method of the fin line on a magnetized ferrite substrate. The method is based on the application of the network analysis techniques of electromagnetic fields (8), (9) in conjunction with the Galerkin's procedure. The determinantal equation for the propagation constant of a unilateral fin line is obtained via matrix formulation. Convergence checks are performed by increasing the number of basis functions for the representation of the aperture field. Some representative numerical results are included in the paper. The method of analysis is quite general and is applicable to other types of fin line structures containing anisotropic media.

20D. Fluid Mechanics

AD-A117 533/0 PC **A03**/MF **A01**
Royal Aircraft Establishment, Farnborough (England).
Wave Drag from Oblique Cross-Sectional Areas.
Technical rept.,
J. Pike. Jan 82, 36p RAE-TR-81155, DRIC-BR-83415

A simple numerical method for estimating the oblique cross-sectional areas of general body shapes is described together with the computer coding. These areas are used in conjunction with Eminton's method for evaluating supersonic wave drag, to produce some accurate estimates of the wave drag of cone-cylinders and some rather less accurate estimates for smooth axisymmetric bodies. (Author)

AD-A117 578/5 Not available NTIS
Cincinnati Univ., OH. Dept. of Aerospace Engineering and Applied Mechanics.
Solution of Particulate Viscous Flow Over a Two Dimensional Cylinder,
B. V. R. Vittal, and W. Tabakoff. 1982, 5p ARO-18560.2-EG
Contract DAAG29-82-K-0029
Presented at the Cavitation and Polyphase Flow Forum, 3rd Joint Thermophysics, Fluids, Plasma, and Heat Transfer Conference, 7-11 Jun 82, St. Louis, MO. Availability: Pub. in AIAA/ASME Conference Proceedings, p57-60 1982 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A117 776/5 Not available NTIS
Rensselaer Polytechnic Inst., Troy NY.
Interactions of Axisymmetric and Non-Axisymmetric Disturbances in the Flow between Concentric Rotating Cylinders: Bifurcations near Multiple Figenvalues,
R. C. Di Prima, and J. Sijbrand. 1982, 5p ARO-16753.9-MA
Contract DAAG29-79-C-0146
Availability: Pub. in Stability in the Mechanics of Continua, p383-386 1982 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A117 806/0 PC **A03**/MF **A01**
Rensselaer Polytechnic Inst., Troy, NY. Dept. of Mathematical Sciences.
New Higher-Order Boundary-Layer Equations for Laminar and Turbulent Flow Past Axisymmetric Bodies.
Technical rept.,
C. Kleinstreuer, A. Eglima, and J. E. Flaherty. Apr 82, 37p AFOSR-TR-82-0588
Grant AFOSR-80-0192

New sets of boundary-layer equations accounting for flow field non-uniformities such as curvature effects, normal stress and pressure variations as well as separation, are derived. The boundary-layer flow domain in subdivided into: (1) a parabolic region where the fluid flow is approximately parallel to the submerged body, i.e., $v << u$; and (2) an elliptic region which includes the line of separation where significant interactions between the boundary-layer and the outer potential flow occur, i.e., v approx u. Closure for the turbulent flow equations has to be obtained with submodels for the Reynolds stresses which reflect the effects of boundary-layer thickening as well as separation. The accuracy of the parabolic equations was compared with Van Dyke's higher-order boundary-layer equations for laminar flow past a body with longitudinal curvature. The results demonstrate that the new modeling equations make a measurable difference as expected from observations made by Bradshaw and others. (Author)

AD-A117 857/3 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Ocean Engineering.
The Transient Heaving Motion of Floating Cylinders,
Ronald W. Yeung. 10 Feb 81, 24p
Contracts N00014-78-C-0390, N00014-78-C-0110
Pub. in Jnl. of Engineering Mathematics, v16 p97-119 1982.

No abstract available.

AD-A117 858/1 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Ocean Engineering.
Numerical Methods in Free-Surface Flows,
Ronald W. Yeung. Apr 82, 49p
Contract N00014-78-C-0390
Pub. in Annual Review of Fluid Mechanics, v14 p395-442 1982.

No abstract available.

DE82780448 MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Reaktorentwicklung.
Spatial Resolution Capabilities with Direct Numerical Simulations of Turbulent Benard Convection.
G. Groetzbach. Jun 80, 53p KFK-2981-B
In German.
U.S. Sales Only. Available in microfiche only.

In a former paper results of numerically simulated turbulent natural convection have been presented for which rather coarse finite difference grids and no subgrid-scale models have been used. These results, and the theoretically determined values for the coefficients of the subgrid-scale heat flux model are tested in this paper on the basis of recent direct numerical simulations using finer grids. As a result of increasing spatial resolution capabilities the earlier published Nusselt numbers decrease by about 6% and the rms-values of

the temperature fluctuations by about 4%. Only less than 1% of the turbulence energy is neglected by the restricted spatial resolution for high wave numbers of the coarse grids used earlier. The theory to calculate the subgrid-scale model coefficients turns out to be a suitable tool to judge on the spatial resolution capabilities of the finite difference grids used actually. Due to the moderate Rayleigh number under consideration all grids used in this work are fine enough to resolve even the smallest relevant turbulence elements; therfore, subgrid-scale models have not to be used. A complete plot output of the analyzing part of the TURBIT computer program is discussed in the appendix. (ERA citation 07:044410)

N82-27688/2 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
Topological Analysis of Computed Three-Dimensional Viscous Flow Fields.
G. S. Deiwert. Jun 82, 13p A-8968, NAS1.15:84255, NASA-TM-84255

Computed solutions of the time-dependent, Reynolds-averaged Navier-Stokes equations for three dimensional flows having thin shear layers are analyzed using topological concepts. Specific examples include the transonic flow over a body of revolution with conical afterbody at moderate angles of incidence to the free stream. Experimental flow-visualization techniques are simulated graphically to visualize the computed flow. Scalar and vector fluid dynamics properties such as pressure, shear stress, and vorticity on the body surface are presented as topological maps, and their relationship to one another in terms of orientation and singular points is discussed. The extrapolation from these surface topologies toward the understanding of external flow-field behavior is and demonstrated.

N82-27701/3 PC **A03**/MF **A01**
von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).
A Numerical Method for the Solution of Internal Pipe/Channel Flows in Laminar or Turbulent Motion.
L. Lourenco, and J. A. Essers. Nov 81, 46p VKI-TN-141

A computer program which is useful in the solution of problems of internal turbulent or laminar flow without recirculation is described. The flow is treated in terms of parabolic boundary layer differential equations. The eddy diffusivity concept is used to model turbulent stresses. Two turbulent models are available: the Prandtl mixing length model and the Nee-Kovasznay model for the effective viscosity. Fluid is considered incompressible, but little program modification is needed to treat compressible flows. Initial conditions are prescribed as well as the boundary conditions. The differencing scheme employed is fully implicit for the dependent variables. This allows the use of relatively large forward steps without stability problems.

N82-28005/8 PC **A03**/MF **A01**
National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
Shall 4: An Implicit Compact Fourth-Order Fortran Program for Solving the Shallow-Water Equations in Conservation Law Form.
I. M. Navon, and H. A. Riphagen. Aug 81, 28p CSIR-TWISK-227

A FORTRAN 4 computer program is documented implementing a compact fourth order accurate finite difference scheme in a spatially factored form, for solving the nonlinear shallow water equations on a limited domain. In contrast to the usual fourth order schemes this compact fourth order scheme requires the solution of only either block tridiagonal or cyclic block tridiagonal coefficient matrices. Moreover this compact fourth order scheme is related o the finite element method and has a smaller truncation error than the usual fourth order schemes. The integral invariants of the shallow water equations were calculated at each time step and were found to be well conserved during the numerical integration, ensuring that a realistic nonlinear structure is obtained. A Schumann-Wallington low pass filtering procedure was incorporated in the program to overcome the increased aliasing due to the higher accuracy method. A third order boundary condition is imposed, preserving the overall fourth order convergence rate of the interior approximation.

N82-28061/1 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Shock-Fitted Euler Solutions to Shock Vortex Interactions.
M. D. Salas, T. A. Zang, and M. Y. Mussaini. May 82, 20p NASA-TM-84481, NAS 1.15:84481

The interaction of a planar shock wave with one or more vortexes is computed using a pseudospectral method and a finite difference method. The development of the spectral method is emphasized. In both methods the shock wave is fitted as a boundary of the computational domain. The results show good agreement between both computational methods. The spectral method is, however, restricted to smaller time steps and requires use of filtering techniques.

N82-28062/9 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Application of Two-Point Difference Schemes to the Conservative Euler Equations for One-Dimensional Flows.
S. F. Wornom. May 82, 45p NASA-TM-83262, NAS 1.15:83262

An implicit finite difference method is presented for obtaining steady state solutions to the time dependent, conservative Euler equations for flows containing shocks. The method used the two-point differencing approach of Keller with dissipation added at supersonic points via the retarded density concept. Application of the method to the one-dimensional nozzle flow equations for various combinations of subsonic and supersonic boundary conditions shows the method to be very efficient. Residuals are typically reduced to machine zero in approximately 35 time steps for 50 mesh points. It is shown that the scheme offers certain advantages over the more widely used three-point schemes, especially in regard to application of boundary conditions.

PB82-253733 PC **A05**/MF **A01**
Iowa Inst. of Hydraulic Research, Iowa City.
On Cylindrical Solitary Waves,
Henry Power Menses, and Allen T. Chwang. Aug 82, 90p IIHR-247
Grant NSF-ENF79-10049

The main objective of this study is to investigate analytically the propagation and focusing of a cylindrical solitary wave in waters of constant depth. In order to accomplish this goal, we applied an inner-outer expansion technique to the cylindrical Boussinesq equations. The results are in good agreement with the numerical solutions found in the literature. The behavior of the cylindrical solitary wave in the outer region is investigated by obtaining an approximate solution of the corresponding cylindrical Korteweg-de Vries equation.

PB82-873134 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Vibrational Analysis in Fluids. 1972-August, 1982 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1972-Aug 82.
Aug 82, 123p
Supersedes PB81-855041.Prepared in cooperation with the National Aeronautics and Space Administration, Washington, DC.

This bibliography contains citations concerning analyses of vibrational, fatigue, stress, and mechanical responses of fluid systems through a range of applications. Experimental studies relative to various shapes and mechanisms working within fluid systems applicable to numerous fields are examined. Specific data and procedures include applications in structural mechanics, aerodynamics, hydrodynamics, and hydraulics. Applications to aerospace engineering are also discussed. (This updated bibliography contains 112 citations, 59 of which are new entries to the previous edition.)

20E. Masers and Lasers

AD-A117 880/5 PC **A02**/MF **A01**
Stanford Univ., CA. Edward L. Ginzton Lab. of Physics.
Developments in Mode-Locked Lasers and their Applications,
A. E. Siegman. 1982, 10p GL-3359, AFOSR-TR-82-0611
Grant AFOSR-80-0145
Pub. in SPIE - Picosecond Lasers and Applications, v322 p60-67 1982.

No abstract available.

AD-A117 899/5 PC **A03**/MF **A01**
EIC Labs., Inc., Newton, MA.
Development of Host Crystals for Ce(+3) Blue and Blue-Green Solid-State Lasers.
Final rept. 1 Jan-30 Jun 82,
R. David Rauh, and A. Nancy Scoville. Jul 82, 32p
Rept no. C-686
Contract N00014-82-C-0142

Blue-green lasers operating at equivalent 480 nm, a region of sea water transparency, could become an integral part of undersea and air-to-sea communication and imaging systems. During Phase I of this program, wide band gap oxides were examined which could support Ce+3 luminescence in this region. A basic requirement for observing Ce+3 d yields f luminescence in this region is a cubic site symmetry as is found in the Th+4 or Ce+4 position of THO2 and CeO2, or the La+3 position of LaAl03 and LaAl1-xScx03 (perovskites). These oxides were synthesized, doped with Ce+3, using either oxidation of mixed oxalates for THO2.Ce, or a combination of component oxides in a molten BaCO3/BaF2 flux for the perovskites. Total luminescence spectra of the oxides revealed a two componenet fluorescence between 400 and 500 nm in all cases, with two excitation maxima between 320 and 380 nm. Some contribution to the spectra from Ce+4 or from an impurity defect center could not be ruled out. A concerted effort on production of optical quality specimens of the promising materials, either as clear ceramics or single crystals, is recommended for Phase II of this investigation so that they may be evaluated as lasers. (Author)

AD-A117 938/1 PC **A02**/MF **A01**
New Mexico Univ., Albuquerque. Inst. for Modern Optics.
Study of Molecular Collision Dynamics for Chemical Laser Systems.
Final technical rept. 1 Aug 80-31 Oct 81,
John C. Bellum, and Michael Burrows. Mar 82, 16p
AFOSR-TR-82-0551
Grant AFOSR-80-0261

This report presents a summary of the research performed from 1 August 1980 - 31 October 1981 under Grant AFOSR - 80 -0261. Part I of the report deals with the theoretical studies of molecular collision dynamics in connection with chemical laser mechanisms, and Part II deals with experimental studies of chemical laser pumping by explosive reactions. (Author)

DE82011973 MF **A01**
Los Alamos National Lab., NM.
Injection Locking of Excimer Lasers.
I. J. Bigio, and M. Slatkine. 1981, 4p LA-UR-82-567, CONF-811229-9
Contract W-7405-ENG-36
International conference on lasers, New Orleans, LA, USA, 14 Dec 1981.
Best available copy from document source. Available in microfiche only.

Reliable injection locking of high-power unstable resonator excimer lasers can be achieved with extremely low reference oscillator power. The criteria for injection locking are discussed and experimental results are given. (ERA citation 07:044381)

DE82012042 MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Preliminary Examination of the Linear Free-Electron Laser.
D. Prosnitz, and A. Szoke. 5 Feb 79, 24p UCID-18703
Contract W-7405-ENG-48
Portions of document are illegible.
Microfiche copies only.

The Linear Free Electron Laser is numerically analyzed in the one dimensional limit by following an average (resonant) particle. Several different wiggler schemes are presented, and electron beam current density requirements are discussed. A variable phase

angle buncher is also proposed. (ERA citation 07:044389)

DE82012379 MF **A01**
Lawrence Livermore National Lab., CA.
Pulse-Power-Conditioning Study for Copper-Vapor Lasers. Final Report, June 25, 1980-May 31, 1981.
1 Jun 81, 23p UCRL-15443
Contract W-7405-ENG-48
Available in microfiche only.

The general purpose of this study was to identify and develop alternative laser power conditioning equipment with the objective of lowering the cost and maintenance of power systems to be used with copper-vapor lasers. As initially proposed this program was to be directed toward the concept definition, design and breadboard evaluation of a pulse power conditioning system for a 15 W copper-vapor laser. However, the emphasis was shifted toward the charging circuit for a pulse power conditioning system operating at the 10 to 20 kW level for use with a somewhat larger copper-vapor laser. Two approaches to the regulated charging circuit were evaluated with respect to their overall system suitability and their potential for use in a breadboard demonstration. The general requirements of circuit concepts to be evaluated were: (1) reliability; (2) minimum capital cost; (3) minimum system power distribution complexity; (4) system and module fault isolation; (5) command-charge capability; and (6) improved charging efficiency. An informal specification was prepared. Two different approaches were examined which included the extension of the existing series thyratron charger and an innovative inverter circuit development. Results are presented and discussed. (ERA citation 07:044390)

DE82012937 PC **A02**/MF **A01**
Rochester Univ., NY. Inst. of Optics.
Nonlinear Optics with Broad-Band Lasers. Progress Report, July 15, 1981-July 14, 1982.
M. G. Raymer. Mar 82, 7p DOE/ER/10979-1
Contract AC02-81ER10979

A pulsed dye laser having a variable spectral width and capable of operating single-mode, multi-mode, or modeless (superradiant) was designed and constructed. Also, a nonlinear intensity auto-correlator which measures the correlation function <I(t)I(t+tau)> of broad-band dye laser pulses was constructed and demonstrated. Detailed characterization of the laser, including correlation and spectral measurements, is underway. (ERA citation 07:044379)

N82-27738/5 PC **A04**/MF **A01**
Battelle-Inst. e.V., Frankfurt am Main (Germany, F.R.).
Development of a Receiver Unit for Laser Data Links: Local Oscillator Laser.
Final Report.
M. Endemann, and W. Englisch. Jan 82, 66p BLEV-R-64.560-1, ESA-CR(P)-1539
Contract ESTEC-4324/80/NL-HP(SC)

A tunable, high pressure, sealed C02 waveguide laser which can serve as local oscillator in a coherent receiver unit for wideband laser communications in space was breadboarded. The laser provides linearly polarized single frequency output in the fundamental transverse mode. The highly stable emission frequency should be tunable over a range of + or - 650 MHz. A 7 yr service life is specified. The longitudinal dc glow discharge sections start easily at pressures up to 200 torr, using a pure He filling. With the grating installed, maximum output power is 250 mW on the P(20) of the 001 to 100 band at 10.59 microns. The selection of different C02 transitions in the same band and tuning the output frequency with the piezo drive are possible. The tuning range, however, is only + or - 250 MHz at 170 torr. The resonator assures operation in the fundamental transverse mode.

N82-27739/3 PC **A04**/MF **A01**
Hartmann und Braun A.G., Frankfurt am Main (Germany, F.R.).
Investigation into the Commercial Application of Infrared Technology: Lead Chalcogenide Laser Diodes.
Final Report.
R. Faulhaber. Mar 82, 68p BMFT-FB-T-82-061, ISSN-0340-7608
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

Possible applications of semiconductor diode lasers, based on ternary Pb chalcogenides, are discussed. The emission range of these lasers is in the middle and far infrared in the wavelength region between 2.5 and 30 micrometers. By means of the chemical composition, the temperature, and the electrical current, a precise adjustment of the emission wavelength of the laser is possible. Applications are in the laboratory as well as in industrial processes, test stands, and in the medical field. The major part of 88% of the total market potential is likely to be in the fields of emission measurement on combustion engines and pollution control. The total market potential of the Federal Republic of Germany is assumed to be 22 million DM per annum.

PAT-APPL-6-327 658 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
A Solar Pumped Laser.
Patent Application,
J. H. Lee, F. Hohl, and W. R. Weaver. Filed 4 Dec 81, 16p N82-25497/0, NASA-CASE-LAR-12870-1
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A solar pumped laser in which the lasant is a gas is described. The gas will photodissociate and lase when subjected to sunrays. Sunrays are collected and directed onto the gas lasant to cause it to lase.

PAT-APPL-6-372 364 PC **A02**/MF **A01**
Department of the Air Force, Washington, DC.
Diffusion Barrier for Long Wavelength Laser Diodes.
Patent Application,
Frank Z. Hawrylo. Filed 27 Apr 82, 24p AD-D009 558/8
Portions of this document are not fully legible.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A discussion barrier is created in a n-type heterojunction layer adjacent to the active region of a semiconductor laser by doping the n-type layer with a periodic table group VI element. The diffusion barrier in the n-type layer prevents the migration of acceptors into that layer. The group VI elements are, in particular, sulfur (S), selenium (Se), and tellurium (Te). The acceptor of concern is zinc (Zn). (Author)

PAT-APPL-6-375 621 PC **A02**/MF **A01**
Department of the Air Force, Washington, DC.
Axial Flow Laser Cavity.
Patent Application,
Paul J. Ortwerth. Filed 6 May 82, 21p AD-D009 569/5
Portions of this document are not fully legible.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An improved gaseous laser device is provided which comprises a generally tubular laser discharge tube having a laser window at each end thereof, each window disposed at an angle to the lasing axis of the device corresponding substantially to the Brewster's angle characteristic of the material comprising the windows, and including means directing substantially uniform flow of gaseous laser medium into and out of the discharge tube substantially at said angle and means providing a choked gaseous exhaust exit for canceling cavity disturbances within the device. Laser optics defining an optical resonant cavity of the laser device may be disposed external of the discharge tube and windows. (Author)

PATENT-4 321 559 Not available NTIS
Department of the Navy, Washington, DC.
Multiwavelength Self-Pumped Solid State Laser.
Patent,
Leon Esterowitz, and Robert C. Eckardt. Filed 3 Apr 80, patented 23 Mar 82, 5p AD-D009 529/9, PAT-APPL-6-137 066
Supersedes PAT-APPL-6-137 066, AD-D007 324.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A new class of solid-state laser which employs self-pumping from internal laser transitions to achieve inversion in other transitions. A LiYF4 laser having an activator of trivalent holmium is pumped by a standard flashlamp or by a doubled Nd laser to populate the 5S2 manifold. Inversion is achieved between 5S2 and 5I5 at 1.4 micrometers. Employing appropriate mirrors, inversion is then produced between 5I5 and 5I7 at 1.7 micrometers. Finally inversion is obtained between 5I7 and 5I8 at 2.06 micrometers. (Author)

20F. Optics

AD-A117 394/7 PC **A02**/MF **A01**
Army Armament Research and Development Command, Dover, NJ. Fire Control and Small Caliber Weapon Systems Lab.
CO2 Laser Waveguiding in GaAs MBE Layers.
Conference paper,
Howard A. Jenkinson, and John M. Zavada. 18 Jun 82, 10p
Paper from the Proceedings of the Army Sciences Conference (1982), 15-18 Jun 82.

In this report, experimental analyses of the electronic and optical properties of a prototype single layer MBE (Molecular Beam Epitaxy) waveguide are presented. A polished (100) wafer of n(+)-GaAs heavily doped with silicon was used as the waveguide substrate. The free carrier concentration was approximately 3 x 10 to the 18th power/cc. An epitaxial layer of n-GaAs lightly doped with tin was then grown on the substrate. The carrier concentration of the epitaxial layer was targeted to be 3 - 5 x 10 to the 15th power/cc.

AD-A117 435/8 PC **A05**/MF **A01**
Naval Research Lab., Washington, DC.
A Synchronous Phase-Detection System for an Optical Interferometric Sensor.
Memorandum rept.,
I. J. Bush. 15 May 82, 78p Rept no. NRL-MR-4808

A system has been developed to accurately detect phase produced in optical interferometric sensors. The system employs optical heterodyning, and it synchronously detects optical phase by feeding an error signal back to a phase modulator in the reference leg of the interferometer. This system is seen to have properties similar to a phase-locked loop used for the demodulation of FM signals. The system model is second order and nonlinear, but a linear approximation serves to accurately describe the system in synchronous operation and is corroborated with well-matched empirical data. The complete model is simulated via computer techniques and is needed to describe the system's parameters that lead to loss and reacquisition of synchronization.

AD-A117 468/9 PC **A02**/MF **A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
Phase Conjugate Optics and Its Potential Applications,
Wu Cunkai, and Fan Junyin. 7 Jun 82, 18p Rept no. FTD-ID(RS)T-0469-82
Edited trans. of Laser Jnl. (China) v8 n9 p42-47 Sep 81.

No abstract available.

AD-A117 506/6 PC **A05**/MF **A01**
Michigan Univ., Ann Arbor.
White Light Optical Processing and Holography.
Final rept. 14 Jun 77-14 Aug 81,
Emmett Leith. Oct 81, 91p 4, AFOSR-TR-82-0485
Grant AFOSR-77-3356

Methods for white light optical processing are reported. Convolution, including deblurring, in white light are described. Also described are methods for introducing a white light reference beam by means of an achromatic 3-grating interferometer, thus allowing a complex output to be recorded as a hologram. Experimental results are shown. (Author)

AD-A117 579/3 Not available NTIS
Rochester Univ., NY. Dept. of Physics and Astronomy.
New Theory of Partial Coherence in the Space-Frequency Domain. Part I. Spectra and Cross Spectra of Steady-State Sources,
Emil Wolf. 20 Jul 81, 11p ARO-16814.12-PH
Contract DAAG29-80-C-0020

Availability: Pub. in Jnl. of the Optical Society of America, v72 n3 p343-351 Mar 82 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A117 580/1 Not available NTIS
Rochester Univ., NY. Dept. of Physics and Astronomy.
Theory of Phase Conjugation with Weak Scatterers,
G. S. Agarwal, and E. Wolf. 23 Jul 82, 8p ARO-16814.11-PH
Contract DAAG29-80-C-0020
Availability: Pub. in Jnl. of the Optical Society of America, v72 n3 p321-326 Mar 82 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A117 759/1 PC **A02**/MF **A01**
Environmental Research Inst. of Michigan, Ann Arbor. Radar and Optics Div.
Reconstruction of the Support of an Object from the Support of Its Autocorrelation,
J. R. Fienup, T. R. Crimmins, and W. Holsztynski. 23 Jul 81, 16p AFOSR-TR-82-0552
Contract F49620-80-C-0006
Pub. in Jnl. of the Optical Society of America, v72 n5 p610-624 May 82.

No abstract available.

AD-A117 761/7 Not available NTIS
Georgia Inst. of Tech., Atlanta. School of Electrical Engineering.
Iterative Design of Pupil Functions for Bipolar Incoherent Spatial Filtering,
Joseph N. Mait, and William T. Rhodes. 1981, 8p ARO-17962.12-EL
Contract DAAG29-81-K-0024
Availability: Pub. in SPIE, v292 p66-72 1981 (No copies furnished by DTIC/NTIS).

No abstract available.

DE82011972 MF **A01**
Los Alamos National Lab., NM.
Ultraviolet Phase Conjugation.
M. Slatkine, I. J. Bigio, R. A. Fisher, M. L. Maloney, and J. R. Busse. 1981, 9p LA-UR-82-566, CONF-811229-10
Contract W-7405-ENG-36
International conference on lasers, New Orleans, LA, USA, 14 Dec 1981, Portions of document are illegible. Best available copy from document source. Available in microfiche only.

Diffraction-limited phase conjugate reflection of an injection-locked high-power (approx. 1 MW) ultraviolet excimer laser beam has been demonstrated via stimulated Brillouin scattering. Reflectivities higher than 70% were attained. Limitations as well as coherence and power requirements for image retention are discussed. (ERA citation 07:044380)

N82-28166/8 PC **A03**/MF **A01**
Zeiss (Carl), Oberkochen (Germany, F.R.).
Gradient Index Glass in Optical Systems.
Final Report.
M. Krautter, F. Muchel, and E. Heynacher. Jan 82, 39p BMFT-FB-T-82-008, ISSN-0340-7608
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

A computer program for ray tracing and optimization of rotationally symmetric optical systems was extended for media with a radial gradient index. Index profiles, according to a power series and to an exponential function, were provided for. In each of the photo-objectives with 5 lenses, an index gradient, according to a power function, was introduced in an element near the aperture stop. With this index gradient, the system was re-optimized. Improvements in image quality occur in the center and zone of the field, but not at the field edge. In microscope objectives, an index gradient according to an exponential function, was introduced at sections where the pencils of rays are separated. The index gradient improves the coma aberration. This is confirmed by an objective that was modified by a gradient index plate, following this design.

PAT-APPL-6-373 756 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Fluorescence Quenching Technique for Scanning Visual Systems.
Patent Application,
James F. Harvey. Filed 30 Apr 82, 9p AD-D009 567/9
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

By using a fluorescer on the viewing surface of a visual screen and illuminating the screen with ultra-violet light, a bright display of the scene is achieved when the laser scan system is operated in the negative mode to quench the fluorescence at spots on the screen that correspond to darker areas in the scene. (Author)

PATENT-4 325 635 Not available NTIS
Department of the Army, Washington, DC.
Heterodyne Indicial Refractometer.
Patent,
Joseph P. Sattler, Terrance L. Worchesky, and Kenneth J. Ritter. Filed 7 Oct 80, patented 20 Apr 82, 7p AD-D009 533/1, PAT-APPL-6-194 736
Supersedes PAT-APPL-6-194 736, AD-D008 227.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A method and apparatus for simply and accurately determing the index of refraction of semiconductor materials, etalon bars and materials transparent to infrared radiation. The channel spectra of the material is obtained by passing through it a portion of radiation from a continuously tuned diode laser. Another portion of the diode laser radiation is heterodyned with radiation from a C02 laser to obtain heterodyne marker beats. The channel spectra and marker beats are displayed in conjunction whereby the frequency difference between the marker beats can be related to the number of fringes in the channel spectra between the marker beats. (Author)

PATENT-4 331 934 Not available NTIS
Department of the Army, Washington, DC.
Cerenkov Submillimeter Electromagnetic Wave Oscillator.
Patent,
Clyde A. Morrison, and Richard P. Leavitt. Filed 29 Oct 79, patented 25 May 82, 4p AD-D009 534/9, PAT-APPL-6-089 051
Supersedes PAT-APPL-6-089 051, AD-D007 517.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The device of the invention comprises a body of dielectric material having a metallic surface on one portion thereof. An electron beam is passed adjacent a second portion of the dielectric body in order to generate electromagnetic radiation in the dielectric. A feedback loop is provided to improve the coherence of the radiation output. (Author)

PB82-255571 PC **A08**/MF **A01**
Standard Electrik Lorenz A.G., Stuttgart (Germany, F.R.).
New Passive Electro-Optical Materials and Applications,
K. Diekstall, A. Gutu-Nelle, J. Lauckner, F. Lutz, and S. Muller. Aug 82, 154p BMFT-FB-T-80-166
Trans. of Neue Passive Elektro-Optische Werkstoffe und Anwendungen, n.p., Dec 80. See also N81-33981.

High-quality electro-optical ceramics based on PLZT (Lead-Lanthanum Zirconate Titanate) can be manufactured economically by coprecipitation of the base materials and vacuum sintering of the green blocks. Magnesium additives halve the operating voltage for the same contrast ratio. Transparent electrodes which remain transparent up to a wavelength of 2,400 nm and provide an overall transparency value of 80% can be formed by sputtering indium-tin oxide. The life of sputtered electrodes is at least 2 x 10 to the 8th power switching cycles. The contrast ratio of PLZT in the light-scattering mode amounts typically to 100:1 at 500 nm, decreasing to 5:1 at 1,000 nm. Switching time (around 50 microseconds s) and electrical field strength (around 1,200 V/mm) for a given contrast ratio increase with operating temperature. In the birefringence mode, the contrast ratio amounts typically to 10,000:1 at a field strength of 800 V/mm and a thickness of 0.4 mm. Although decreasing with increasing wavelength, the PLZT contrast ratio with birefringence can be regarded as constant in the visible range at a value of about 6,000:1. The half-wave voltage necessary for a set contrast ratio increases with wavelength and temperature. In tests, PLZT specimens performed well as light modulators, light-intensity stabilisers, and welding-helmet visors. They were not competitive with existing technologies for numerical displays.

20G. Particle Accelerators

DE82008395 PC **A16**/MF **A01**
Brookhaven National Lab., Upton, NY.
ISABELLE. Volume 3. Experimental Areas, Large Detectors.
1981, 352p BNL-51443-V.3, CONF-810759-Vol.3
Contract AC02-76CH00016
Physics opportunities at ISABELLE summer workshop, Upton, NY, USA, 20 Jul 1981, Portions of document are illegible.
Microfiche only after original copies are exhausted.

This section presents the papers which resulted from work in the Experimental Areas portion of the Workshop. The immediate task of the group was to address three topics. The topics were dictated by the present state of ISABELLE experimental areas construction, the possibility of a phased ISABELLE and trends in physics and detectors. (ERA citation 07:044519)

DE82009001 MF **A01**
Oklahoma Univ., Norman.
Transitional Nuclei in the A-100 Region. Progress Report.
R. F. Petry. 1981, 26p DOE/ER/10495-2
Contract AS05-79ER10495
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

The TRISTAN on-line isotope separator at the Brookhaven High Flux Beam Reactor has been operating productively and reliably with a surface ionization ion source since November of 1980. The yields of neutron-rich fission products of Rb, Sr, Cs, Ba exceed those of any similar facility. Important studies of previously unstudied isotopes of these elements as well as more detailed and definitive new studies of previously studied isotopes and their descendents have occupied the experimenters at TRISTAN since that time. Because of the emphasis in this early stage on development of the facility, most efforts have been collaborative as indicated in the abstracts contained in section V. The Oklahoma group has been a part of these efforts since the beginning. (ERA citation 07:047806)

DE82012047 MF **A01**
Lawrence Livermore National Lab., CA.
ATA Diagnostic Beam Dump Conceptual Design.
Sep 81, 81p UCRL-15435
Contract W-7405-ENG-48
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

A diagnostic beam dump, able to withstand 72,000 pulses (10 kA, 50 MeV/pulse) per shift was designed and analyzed. The analysis shows that the conceptual beam dump design consisting of 80 vitreous carbon plate-foam elements is able to withstand the thermal and mechanical stresses generated. X-rays produced by bremsstrahlung are absorbed by a three element copper plate-foam x-ray absorber. Cooling between bursts of electron pulses is provided by pressurized helium. (ERA citation 07:044462)

20H. Particle Physics

AD-A117 784/9 PC **A02**/MF **A01**
Rutgers - The State Univ., New Brunswick, NJ. Dept. of Mathematics.
The Mean Spherical Approximation for a Yukawa Fluid Interacting with a Hard Planar Wall with an Exponential Tail,
Douglas Henderson, Joel L. Lebowitz, Lesser Blum, and Eduardo Waisman. 23 Apr 79, 5p AFOSR-TR-82-0594
Grants AFOSR-73-2430, NSF-CHE77-14611
Pub. in Molecular Physics, v39 n1 p47-50 1980.

No abstract available.

DE82007918 PC **A99**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Fifth High-Energy Heavy-Ion Study.
Oct 81, 752p LBL-12652, CONF-8105104-
Contract W-7405-ENG-48
High energy heavy ion study, Berkeley, CA, USA, 18 May 1981, Portions of document are illegible.
Microfiche only after original copies are exhausted.

This was the fifth of a continuing series of summer studies held at LBL to discuss high energy heavy ion collisions. Recently, a similar meeting has been held on alternate years at GSI (Darmstadt); and, in 1979, we held a meeting at LBL exclusively devoted to ultra-relativistic nuclear collisions. Two new features distinguish this study from earlier meetings in the series. First, the energy range for discussion was broadened by including collisions from about 20 MeV/nucleon to the highest available in the cosmic radiation. The lower range, particularly below 100 MeV/nucleon, will be under intense study in the near future with machines such as the upgraded Bevalac, Michigan State University Superconducting Cyclotron, GANIL in France, and the SC at CERN. Recently, the high energy collision regime has been expanded by the successful operation of the CERN ISR with alpha particles. Second, in addition to an extensive program of invited talks, we decided for the first time to actively solicit contributions. Forty-seven individual items from the conference were prepared separately for the data base. (ERA citation 07:052159)

DE82008357 PC **A02**/MF **A01**
Oregon Univ., Eugene. Inst. of Theoretical Science.
Hadronization of Gluons in Quark and Gluon Jets.
V. Chang, G. Eilam, and R. C. Hwa. Dec 80, 13p
DOE/ER/70004-307
Contract AT06-76ER70004
Portions of this report are illegible.

Fragmentation functions are calculated for quark and gluon jets decaying into mesons which couple substantially to two gluons. We then find a sizable increase for the eta' / pi exp 0 ratio in a gluon jet as compared to a quark jet. This increase is a signature for the color content of Quantum Chromodynamics and a possible tool to isolate gluon jets. (ERA citation 07:052009)

DE82008364 MF **A01**
Oregon Univ., Eugene. Inst. of Theoretical Science.
Connection Between Nonleptonic K/sub 2 pi / and D/sub K pi / Decays and Constraints on the Quark-Spectator Model.
G. Eilam, B. H. J. McKellar, and M. D. Scadron. Jun 81, 9p DOE/ER/70004-314
Contract AT06-76ER70004
Portions of document are illegible. MN only.
Microfiche copies only.

We show that a unified picture of the current-current amplitudes for K/sub 2 pi / and D/sub K pi / weak nonleptonic decays requires the spectator-quark model to be valid. We then demonstrate that these amplitudes are consistent with data and QCD color suppression provided the color-suppressed to color-enhanced amplitude ratio is of opposite sign as compared to that found by neglecting color-octet terms in the Fierz identity. (ERA citation 07:045000)

DE82008684 PC **A03**/MF **A01**
Fermi National Accelerator Lab., Batavia, IL.
Two-Photon Physics.
W. A. Bardeen. Oct 81, 27p FERMILAB-Pub-81/74-THY, CONF-810895-11
Contract AC02-76CH03000
International symposium on lepton and photon interactions at high energies, Bonn, F.R. Germany, 24 Aug 1981, Portions of document are illegible.

A new experimental frontier has recently been opened to the study of two photon processes. The first results of many aspects of these reactions are being presented at this conference. In contrast, the theoretical development of research ito two photon processes has a much longer history. This talk reviews the many different theoretical ideas which provide a detailed framework for our understanding of two photon processes. (ERA citation 07:044956)

DE82011516 MF **A01**
Harvard Univ., Cambridge, MA. Dept. of Physics.
Experimental Considerations for a Sensitive Neutron-Antineutron Oscillation Search.
M. S. Goodman, R. Wilson, and H. O. Cohn. 1982, 17p CONF-820135-1
Contract W-7405-ENG-26
International colloquium on baryon nonconservation, Bombay, India, 11 Jan 1982, Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

The experimental considerations for the design of an experiment to search for (delta B = 2) neutron-anti-neutron mixing are presented. A comparison of free-neutron sources leads to the choice of a reactor facility based on the ORR reactor at the Oak Ridge National Laboratory as the facility with the largest Nt exp 2 . A proposed experiment to measure the antineutron annihilation signature (approx. 2 GeV into pions) is described. Features of the design of the experiment, including a 20-m evacuated magnetically shielded flight path, a detector sensitive to energy and particle multiplicity, and an active cosmic ray shield and anticoincidence, are presented. A brief status report of studies currently in progress, including both detector tests at a reactor facility and computational modeling, is given. The proposed experiment should be capable of attaining values of Nt exp 2 > 3 x 10 exp 9 sec. (ERA citation 07:046854)

DE82012168 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Spin Excitations in Pion Inelastic Scattering.
S. J. Seestrom-Morris, D. B. Holtkamp, and W. B. Cottingame. 1982, 20p LA-UR-82-854, CONF-820357-1
Contract W-7405-ENG-36
International conference on spin excitations in nuclei, Telluride, CO, USA, 25 Mar 1982, Portions of document are illegible.

The data on spin excitations observed in pion inelastic scattering are reviewed. A predominant feature of this process is the selectivity with which high-spin unnatural-parity states are excited. Constant-q excitation functions have proven valuable in identifying unnatural-parity states because of the unique signature of delta S = 1 transitions. It has recently been shown that angular distributions measured for transitions to natural-parity states are quite different for delta S = 0 and delta S = 1 transitions. Pion scattering should continue to prove useful in studying the spin structure of nuclear transitions because of the sensitivity of both excitation functions and angular distributions to the spin transferred to the nucleus. In particular, pion scattering measurements may be helpful in searches for spin-mode giant resonances. In addition to the ability to distinguish transitions dominated by delta S = 1, comparisons of pi exp + and pi exp - scattering can be used to determine the relative contributions of neutrons and protons to inelastic transitions. In each N not equal to Z nucleus studied there have been large pi exp + / pi exp - , asymmetries observed for some transitions to stretched states. This results in information that is not obtainable from 180 exp 0 electron scattering. (ERA citation 07:045122)

DE82012297 PC **A03**/MF **A01**
Louisiana State Univ., Baton Rouge. Dept. of Physics and Astronomy.
Structure of Nuclei Far from beta Stability. Progress Report, May 15, 1981-May 14, 1982.
E. F. Zganjar. 1982, 30p DOE/ER/04935-053
Contract AS05-76ER04935

Progress on experimental studies of the nuclear structure of nuclei far from beta stability is reported. Investigations at UNISOR, GSI, and TRISTAN are described. Investigations at UNISOR include odd-proton nuclei of gold, thallium, and cesium and odd-neutron deficient nuclei of mercury and platinum.

DE82012362 PC **A03**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Some Calculator Programs for Particle Physics.
C. G. Wohl. Jan 82, 28p LBL-13987
Contract W-7405-ENG-48

Seven calculator programs that do simple chores that arise in elementary particle physics are given. LEGENDRE evaluates the Legendre polynomial series sigma a/sub n/P/sub n/(x) at a series of values of x. ASSOCIATED LEGENDRE evaluates the first-associated Legendre polynomial series sigma b/sub n/P/sub n/ exp 1 (x) at a series of values of x. CONFIDENCE calculates confidence levels for chi exp 2 , Gaussian, or Poisson probability distributions. TWO BODY calculates the c.m. energy, the initial- and final-state c.m. momenta, and the extreme values of t and u for a 2-body reaction. ELLIPSE calculates coordinates of points for drawing an ellipse plot showing the kinematics of a 2-body reaction or decay. DALITZ RECTANGULAR calculates coordinates of points on the boundary of a rectangular Dalitz plot. DALITZ TRIANGULAR calculates coordinates of points on the boundary of a triangular Dalitz plot. There are short versions of CONFIDENCE (EVEN N and POISSON) that calculate confidence levels for the even-degree-of-freedom-chi exp 2 and the Poisson cases, and there is a short version of TWO BODY (CM) that calculates just the c.m. energy and initial-state momentum. The programs are written for the HP-97 calculator.

DE82701196 MF **A01**
Akademiya Nauk URSR, Kiev. Inst. Teoreticheskoi Fiziki.
CP-Violation and Mixing in the Systems K exp 0 , Anti K exp 0 , D exp 0 , Anti D exp 0.
G. G. Volkov, V. A. Monich, and B. V. Struminskij. 1981, 33p ITF-80-142-R
In Russian.
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

An evaluation is made of a possible contribution into the mixing processes and the CP-violation in the systems K exp 0 , anti K exp 0 ; D exp 0 , anti D exp 0 of gauge weak and superweak horizontal interactions and also of the Yakawa-type interactions. A soft spontaneous CP-invariance violation is assumed. (Atomindex citation 13:657989)

DE82701197 MF **A01**
Akademiya Nauk URSR, Kiev. Inst. Teoreticheskoi Fiziki.
Behaviour of the Scattering Amplitude Between Elastic and Inelastic Cuts.
N. I. Glusnko, and N. A. Kobylinsky. 1980, 21p ITP-80-97-E
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

The behaviour of the amplitude between elastic and inelastic cuts is studied on the basis of elastic unitarity condition and notions of analytic properties of the scattering amplitude. The singularity structure of the amplitude is found and the upper and lower bounds on its asymptotic growth are obtained. It is found that the asymptotic regime is sensitive to the relation between elastic and ineleastic cross-sections, the case corresponding to the black disc limit being critical. (Atomindex citation 13:657990)

DE82701199 PC **A02**/MF **A01**
Kozponti Fizikai Kutato Intezet, Budapest (Hungary).
Monte-Carlo Simulation Combined with a Hopping Parameters Expansion.
A. Hasenfratz, and P. Hasenfratz. Jun 81, 11p KFKI-1981-47
U.S. Sales Only.

The fermionic contribution to the effective action is a sum over simple closed loops in configurational space. Loops which are much larger than the characteristic length of the problem are expected to be irrelevant. In the parameter region where the characteristic length is small, an expansion in the size of the loops is suggested. The method was used on a 2 exp 4 lattice in SU(2) with two flavours in order to compare with the results of Petcher and Weinharten who simulated the complete action. The authors have reproduced their results. Using this technique the computer time is reduced by orders of magnitude. (Atomindex citation 13:657994)

DE82701202 MF **A01**
Kozponti Fizikai Kutato Intezet, Budapest (Hungary).
Nucleon Form Factors in the Geometrodynamical Model.
T. Margaritisz, and K. Szegoe. Sep 81, 12p KFKI-1981-76
U.S. Sales Only. Available in microfiche only.

In this paper the G/sub E/ and G/sub M/ form factors of the proton and neutron are calculated in the geometrodynamical model of hadrons. The asymptotic behaviour and the gross features are correctly reproduced, but in fine details there are deviations from the experimental data. (Atomindex citation 13:657997)

DE82701203 PC **A02**/MF **A01**
Eotvos Lorand Univ., Budapest (Hungary). Elmeleti Fizikai Intezet.
Upper Bounds on Higgs Boson Masses in the Weinberg-Salam Model with Three Higgs Doublets.
E. Lendvai, and G. Pocsik. Jul 81, 14p REU-ITP-403
U.S. Sales Only.

In the Weinberg-Salam model with three Higgs doublets, the positivity of masses and the tree graph unitarity applied to Higgs scatterings lead to upper bounds on Higgs masses. (Atomindex citation 13:657998)

DE82701204 MF **A01**
National Lab. for High Energy Physics, Oho (Japan).
Proceedings of the Workshop on Two-Nucleon System.
M. Kawaguchi, M. Namiki, M. Fukawa, and A. Masaike. Aug 80, 103p KEK-80-7, CONF-7910267-
In Japanese.Workshop on two-nucleon system, Oho, Japan, 19 Oct 1979.
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

The workshop on two nucleon system started its works four years ago to promote the experiment project on nucleon-nucleon system in the National Laboratory for High Energy Physics by the close cooperation of experimenters and theorists. In particular, several proposals have been made about the experiments using the polarized targets of hydrogen and deuterium, the spectrometers of large solid angle and others, and the investigation into them have been forwarded. It was decided to publish the results of the fourth meeting held in the National Laboratory for High Energy Physics on October 19 and 20, 1979, as the interim report, summarizing the contents. Some of the initial objectives have not been realized yet, but the data have been produced gradually from the experiments in the National Laboratory for High Energy Physics, and are contributing to various analyses. This report is composed of the physics of nucleon-nucleon systems and anti-nucleon-nucleon systems, the results of experiments and the projects corresponding to them, and the hypothetic round-table talk on the points which this workshop considers as problematic and the views of outside researchers on the National Laboratory for High Energy Physics. Finally, the materials distributed at the time of the meeting are added for reference as the appendix. Some numerical values are mutually different, but adjustment was not made. (Atomindex citation 13:658126)

DE82701206 MF **A01**
Akademiya Nauk URSR, Kiev. Inst. Teoreticheskoi Fiziki.
Problem of Three Strongly Interacting Particles Two of Which Are Charged.
V. F. Kharchenko, and S. A. Shadchin. 1980, 32p
ITF-80-122-R
In Russian.
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

The integral equations for the system of three particles two of which are charged are reformulated separating out explicitly from the kernel, all the singularities that arise due to the presence of the long-range Coulomb pair interaction. The kernel of the regularized set of equations (Faddeev-Noble's type equations) is determined by the solution of an auxiliary problem. The developed formalism allows one to define the finite nuclear-Coulomb scattering length of a particle by two other particles in a bound state. The obtained equations are valid at all energies of the three-particle system. (Atomindex citation 13:658234)

DE82701207 PC **A02**/MF **A01**
Kozponti Fizikai Kutato Intezet, Budapest (Hungary).
Quarkochemistry in Relativistic Heavy Ion Collisions.
T. Biro, and J. Zimanyi. Aug 81, 9p KFKI-1981-69
U.S. Sales Only.

The time necessary to achieve the equilibrium ratio of strange to non strange quarks in heavy ion reactions is estimated in the framework of perturbative QCD. It is found, in the present approximation, to be much larger than the total collision time of even a central U + U collision at E/sub LAB/ = 2.1 GeV/nucleon bombarding energy. (Atomindex citation 13:658235)

DE82701208 MF **A01**
International Atomic Energy Agency, Vienna (Austria). International Nuclear Data Committee.
Nuclear Data Evaluation for exp 239 Pu in the Energy Region 100 075. Ev to 15 MeV.
G. V. Antsipov, L. A. Bakhanovich, and V. F. Zharkov. Jun 81, 188p INDC(CCP)-166/GHJ
U.S. Sales Only. Available in microfiche only.

The present work incorporates the results of the new nuclear data evaluation for exp 239 Pu. The complete file compiled by the authors in 1974 was practically completely re-examined. The most substantial changes were made above 0.5 keV. In the region of unresolved resonances (0.3 to 100 keV), the channel contribution to the process widths for a given state and some other aspects were taken into account. The fission cross section and the alpha -value were evaluated with regard for the correlation of experimental errors. The non-spherical potential with optimized parameters was used to make calculations by the optical and statistical models. The contribution of pre-equilibrium emission was taken into account in calculations of secondary neutron spectra. The new standard anti nu/sub sp/(exp 252 C/sub f/) was used to calculate anti nu/sub p/. The 26-group constants and g-Westcott factors were obtained from the evaluated data. The complete file of the evaluated data for exp 239 Pu is presented in the ENDF/B format and conveyed to the Nuclear Data Section of the IAEA. (Atomindex citation 13:658365)

DE82701213 MF **A01**
Jyvaeskylae Univ. (Finland). Dept. of Physics.
Medium-Spin Levels and a 360 Ns I/Sup pi / = (19/2) exp - Isomer in the N = 80 Nucleus exp 137 La.
M. Kortelahti, A. Pakkanen, M. Piiparinen, T. Komppa, and R. Komu. Mar 81, 25p JYFL-RR-3/81
U.S. Sales Only. Available in microfiche only.

The level structure of exp 137 La has been studied using the exp 138 Ba(p,2n) reaction and methods of in-beam gamma -ray and conversion-electron spectroscopy. The exp 137 La level scheme has been established with 21 new levels with spins up to (19/2) exp - . A 360 ns (19/2) exp - isomer at 1870 keV has been identified and a (pi g/sub 7/2/(nu h/sub 11/2/ exp - d/sub 3/2/ exp - /sub 7 exp - /)/sub 19/2/ exp - configuration is suggested for it. The level ordering of the pi h/sub 11/2/ x 2 exp + multiplet has been discussed on the basis of the triaxial rotor-plus-particle model which suggests a slightly oblate triaxial shape to the exp 137 La nucleus. (Atomindex citation 13:658390)

DE82701214 MF **A01**
Jyvaeskylae Univ. (Finland). Dept. of Physics.
Experimental and Theoretical Two-Nucleon Interaction Energies in the Lead Region.
T. Loennroth. Mar 81, 40p JYFL-RR-4/81
U.S. Sales Only. Available in microfiche only.

Tables of total and interaction energies as a function of spin are reported. They include all known experimental and theoretical two-nucleon configurations in exp 210 Po, approx.at exp 10 Bi, exp 210 Pb, exp 206 Pb, exp 208 Bi, exp 208 Tl, exp 206 Pb, exp 206 Tl, and exp 206 Hg. Only states constructed from bound single-nucleon or first main shell orbitals are considered. The methods of calculation with the reported matrix elements is shortly outlined. Explicit examples are given as to the application through mass scaling of lead region interaction energies to other nuclear regions where the shell model is applicable. (Atomindex citation 13:658391)

DE82701215 MF **A01**
Lund Univ. (Sweden). Fysiska Institutionen.
Near-Yrast Spectroscopy of exp 165-167 Yb.
N. Roy, S. Jonsson, H. Ryde, W. Walus, and J. J. Gardhoeje. Nov 81, 58p LUIP-8107, LUNFD6/NFFK-7008/1-43/(1981)
U.S. Sales Only. Available in microfiche only.

The lowest (pi , alpha) = (+,+), (+,-) and (-,+) rotational sequences in exp 165 Yb, exp 167 Yb as well as the lowest (-,-) sequence in exp 165 Yb have been established to high spins. The single- quasineutron portions of these sequences are used to construct corresponding configurations in exp 165-167 Yb. Such a comparison indicates that the residual interactions between two quasineutron are nearly independet of phonon energy and configuration (for those stuied), are attractive and are equal to about 300 keV. For three-quasineutron configurations a phonon energy dependence is observed in the residual interaction, which can be interpreted as a reduction in alignment for the three-quasineutron configurations, a result of reduced pairing. Difficulties in reproduction the signature-dependent energy-splitting and band-crossing frequencies in the positive- parity decay sequence are not completely understood. The signature dependence of the interband-intraband branching ratios as well as of the interband M1/E2 mixing ratios provide an experimental justification of the signature dependence of B(M1) transition rates recently suggested by Hamamoto. (Atomindex citation 13:658393)

DE82701216 PC **A04**/MF **A01**
Zentralinstitut fuer Kernforschung, Rossendorf bei Dresden (German D.R.)
Nuclear Structure Studies by Means of Magnetic Moments of Excited States. Magnetic Moments in exp 103 Pd, exp 105 Ag, exp 117 Sb, /Sup 117,121/ Te, exp 121 I, exp 143 Pm, and exp 207 Bi.
L. Kaeubler, H. Prade, L. Schneider, H. F. Brinckmann, and F. Stary. Sep 81, 66p ZfK-455
In German.
U.S. Sales Only.

Experimental arrangements installed at the cyclotron U-120 and the tandem accelerator EGP-10 for the in-beam measurement of magnetic moments of excited nuclear states are discribed. The Perturbed-Angular-Distribution-method (PAD) has been used. A new evaluation method has been developed for the unique determination of the Larmor frequency from spin-procession spectra R(t) with less than half of an oscillation period between consecutive particle pulses. Magnetic moments in transitional nuclei or in nuclei near closed shells (exp 103 Pd, exp 105 Ag, exp 117 Sb, exp 117 Te, exp 11 Te, exp 11 I, exp 143 Pm and exp 207 Bi) were measured. The results are discussed with the aim to get information about the nuclear structure of the corresponding isomeric states in connection with complex spectroscopic investigations. Therefore, the experimental values are compared to the results of model calculations (core-polarization, core-particle-coupling, Nilsson, particle-rotation-coupling or shell-model) or to the estimates on the basis of the additivity of effective magnetic moments. Single-particle aspects are discussed in connection with the magnetic moments of h/sub 11/2/-, d/sub 5/2/- and g/sub 7/2/-neutron (nu) and proton (pi) states in the nuclei exp 103 Pd, exp 117 Te, exp 121 Te and exp 143 Pm, respectively. The configurations of (pi) exp 3 and (pi)(nu) exp 2 -three-particle states in exp 105 Ag, exp 117 Sb, exp 121 I and exp 207 Bi could be determined using the additivity rule. The experimental magnetic moments of states in exp 143 Pm agree. (Atomindex citation 13:658394)

DE82701439 MF **A01**
International Centre for Theoretical Physics, Trieste (Italy).
Recurrence Formulae for Lepton and Quark Generations.
W. Krolikowski. Oct 79, 20p IC-79/144
U.S. Sales Only. Available in microfiche only.

Some phenomenological recurrence equations suggested recently for lepton and quark generations are reviewed. They predict the charged lepton of the fourth generation at 28.5 GeV and the up and down quarks of that hypothetic generation at about 250 GeV and 62 GeV, respectively. The top quark, i.e., the up quark of the third generation, is predicted at about 20 GeV. In the appendix a toy model with a statistical interpretation of mass spectral law is described. (Atomindex citation 13:660805)

DE82701440 MF **A01**
International Centre for Theoretical Physics, Trieste (Italy).
Gauge Invariance and Fermion Mass Dimensions.
V. Elias. May 79, 11p IC-79/52
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

Renormalization-group equation fermion mass dimensions are shown to be gauge dependent in gauge theories possessing non-vector couplings of gauge bosons to fermions. However, the ratios of running fermion masses are explicitly shown to be gauge invariant in the SU(5) and SU(2) x U(1) examples of such theories. (Atomindex citation 13:660806)

DE82701441 MF **A01**
International Centre for Theoretical Physics, Trieste (Italy).

Lambda Non-Leptonic Decays as a Test for Gluon Corrections to Non-Leptonic Hyperon Decays.
May 79, 10p IC-79/53
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

It is shown that data on lambda exp - non-leptonic decays support the estimates of gluon exchange corrections found necessary to understand the non-leptonic decays of hyperons. (Atomindex citation 13:660807)

DE82701442 MF **A01**
International Centre for Theoretical Physics, Trieste (Italy).
Non-Leptonic Radiative Decays of Hyperons in a Gauge-Invariant Theory.
May 79, 12p IC-79/54
U.S. Sales Only. Available in microfiche only.

The radiative non-leptonic decays of hyperons are studied in a non-relativistic quark model involving the quark-quark scattering process s + u implies u + d through the W exp - exchange and s + d implies q + q through a gluon exchange so that the effective Hamiltonian involves four quark operators. The effective parity-violating Hamiltonian for such decays is obtained in a gauge-invariant way from the corresponding Hamiltonian for ordinary non-leptonic decays, while the parity-conserving radiative decays are simply given by baryon poles. A satisfactory agreement with experimental data is obtained. (Atomindex citation 13:660808)

DE82701443 MF **A01**
International Centre for Theoretical Physics, Trieste (Italy).
Beauty and the T Meson Family.
M. Ahmad, M. S. Jallu, G. Q. Sofi, and A. Samad. Jul 79, 13p IC-79/55
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

The spectrum and the decay modes by weight diagrams of beautiful mesons are studied. The masses of mesons in broken SU(5) symmetry are calculated. (Atomindex citation 13:660809)

DE82701444 MF **A01**
International Centre for Theoretical Physics, Trieste (Italy).
P And T Violating Electromagnetic Interaction of the Quark in the Instanton Field.
G. Calcucci, R. Jengo, F. Legovini, and N. Paver. Jul 79, 27p IC-79/86
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

The Green function of a quark interacting with an external electromagnetic field are studied when propagating in a background instanton field. By expanding in the instanton size rho the leading order in rho of the time reversal and parity violating effective vertex in momentum space are analytically evaluated when the vacuum characterizing angle THETA is THETA unequal THETA. It is found that this leading term of the vertex vanished when sandwiched between free quark states; when taken between bound states, however, for instance in a Coulomb-like potential, it gives rise to the usual electric dipole form. The results and its dependence on the cutoff on the instanton size rho, in the light of the existing bound on the electric dipole moment of the neutron are discussed. (Atomindex citation 13:660810)

DE82701445 MF **A01**
International Centre for Theoretical Physics, Trieste (Italy).
Quarks as Conformal Semi-Spinors.
P. Budini. Jul 79, 20p IC-79/88
U.S. Sales Only. Available in microfiche only.

The hypothesis is formulated that quarks may be represented by Cartan conformal semi-spinors. Some of the properties usually assigned to standard Dirac spinor quarks may also be assigned to semi-spinor quarks and some of them result quite simply from the geometry of semi-spinors. A charge matrix is obtained which is fractional for Cartan semi-spinors (quarks) and integer for Dirac spinors (leptons) through an orthogonal rotation in the flavor-color plane. The angle of rotation depends on the ratio of flavor and color coupling constants. When restricted to the nu e lepton doublet, the Salam-Weinberg Lagrangian is easily obtained from the postulated hypothesis. (Atomindex citation 13:660811)

DE82701446 MF **A01**
Institute of Nuclear Physics, Krakow (Poland).
Quark Model and Nucleus-Nucleus Collisions at High Energies.
A. Bialas, and W. Czyz. 1980, 23p INP-1114/PH
U.S. Sales Only. Available in microfiche only.

An extrapolation of the additive quark model of hadron-hadron and hadron-nucleus collisions to the case of nucleus-nucleus interactions at very high energies is presented. (Atomindex citation 13:660812)

DE82701447 MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Teoreticheskoi i Eksperimental'noi Fiziki.
Possible Connection Between Hard and Soft Processes.
A. V. Kaidalov. 1980, 21p ITEP-151(1980)
U.S. Sales Only. Available in microfiche only.

Characteristics of hadrons in final states in peripheral and hard processes is discussed on the basis of the topological expansion, the string and colour tube models. Relations between inclusive spectra of hadrons in nu - and anti nu -nucleon interactions and the definite combinations of inclusive spectra in hadron-hadron interactions are obtained. Behaviour of inclusive distributions and structure functions at Feynman Variable X/sub F/ implies 0 and Bjorken variable X/sub B/ implies 0, 1 is discussed. (Atomindex citation 13:660813)

DE82701448 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Investigation of the Dimensions of Secondary Particle Emission Region in pi exp - N Interactions at 40 GeV/C.
A. A. Kuznetsov. 1981, 9p JINR-E-1-81-405, CONF-810760-12
International conference on high energy physics, Lisbon, Portugal, 9 Jul 1981.
U.S. Sales Only.

New results of the interference effect of secondary negative pions produced at the pi exp - N-collision at 40 GeV/c are investigated. The interference effect is observed in all cases but sometimes its value appears to be smaller than the expected one. Some natural possibilities of interpreting this phenomenon are analyzed. In particular it could occur if identical pi -mesons are generated by sources of quite different sizes. (Atomindex citation 13:660814)

DE82701450 MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Meson Cloud Model of High Energy Hadron-Hadron Scattering.
S. V. Goloskokov, S. P. Kuleshov, and O. V. Seliugin. 1981, 10p JINR-E-2-81-441
U.S. Sales Only. Available in microfiche only.

Using the assumption on the presence of the central part of a hadron where the valence quarks are concentrated, and taking into account the effects of a mesonic cloud, the scalar eikonal model is proposed. The quasipotential obtained permits us to reproduce quantitatively all properties of hadron elastic scattering in a wide momentum transfer region. (Atomindex citation 13:660816)

DE82701451 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
K/Sub S/ Meson Regeneration on Nuclei in the Color Quark Model.
B. Z. Kopeliovich, L. I. Lapidus, and A. B. Zamolodchikov. 1981, 6p JINR-E-2-81-442
U.S. Sales Only.

The process of K/sub s/ regeneration on nuclei in the color quark model is investigated. The process of K/sub s/ regeneration on nuclie at high energies picks out those configurations in the incident K meson which have a large radius. This leads to stronger absorbtion of K meson by nuclear matter, because the colorless hadron can interact with gluon field of a target only through its color charge spread. The calculation of the regeneration amplitude for different nuclei showed good agreement with experimental data. (Atomindex citation 13:660817)

DE82701452 MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
V Implies Panti Ll Decays in the Nonlocal Quark Model.
M. Dineikhan, G. V. Efimov, and M. A. Ivanov. 1981, 11p JINR-R-2-81-272
In Russian.
U.S. Sales Only. Available in microfiche only.

(V implies P anti ll, P implies V anti ll) Dalitz decays of vector and pseudoscalar mesons in the nonlocal quark model are considered. Dalitz decay widths are presented. It turned out that the allowance for the structure of quark units gives a considerable contribution into formfactors of omega implies pi exp 0 mu exp + mu exp - , omega implies eta mu exp + mu exp - , rho implies pi mu exp + mu exp - , rho implies eta mu exp + mu exp - , and other decays. The obtained results agree well with the experimental data. (Atomindex citation 13:660818)

DE82701453 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Fundamental Length and Helicity Nonconservation at High Energies.
R. M. Ibadov, and M. B. Chizhov. 1981, 7p JINR-R-2-81-461
In Russian.
U.S. Sales Only.

The cross sections of e exp - e exp + implies e exp - e exp - , e exp - e exp + implies e exp - e exp + , and e exp - e exp + implies mu exp - mu exp + processes at high energies are calculated taking into account polarized initial and final particles. The Lagrangian of quantum electrodynamics with the fundamental length is chosen as an effective interaction Lagrangian. All the calculations are made in the Euclidian space; the transfer to the ordinary pseudoeuclidian space is established in the final expressions only. The processes forbidden in the ordinary electrodynamics are signed out and their possible experimental check is discussed. (Atomindex citation 13:660819)

DE82701454 MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Calculation of Neutron Radius in the Bag Model with Linear Confinement.
A. E. Dorokhov. 1981, 5p JINR-R-2-81-501
In Russian.
U.S. Sales Only. Available in microfiche only.

Neutron radius is calculated in the framework of the bag model with the linear confining potential. Nonzero result is obtained owing to taking into account the quark-gluon interaction by perturbation theory. The calculated value of the neutron radius may agree with experimental ones. The result is essentially different from the result obtained within the bag model with the infinite square-well potential. The differences of the location of the energy levels and of the value <r sub 122 > characterizing the overlapping of the ground and first excited states are the cause of distinction of the data. (Atomindex citation 13:660820)

DE82701455 PC **A03**/MF **A01**
Hiroshima Univ., Takehara (Japan). Research Inst. for Theoretical Physics.
Nonleptonic Decays of Charmed Mesons under the W-Exchange Dominance Hypothesis.
K. Terasaki. Feb 81, 32p RRK-81-2
U.S. Sales Only.

Two- and three-body decays of charmed mesons are studied under the W-exchange dominance hypothesis. As for the two-body decays, the branching ratios for them are calculated in the scalar meson pole approximation. It is seen through a phenomenological analysis that the contribution of the annihilation diagram is much smaller than that of the W-exchange as has been expected in terms of 1/N expansion. This predicts that the F exp + implies pi exp + eta decay is considerably suppressed although it is a Cabibbo favored decay. It is also seen that the new Cabibbo angle theta/sub c/' which is defined in the charm changing currents is nearly equal to the old one theta/sub c/. The soft meson technique combined with a linear approximation is applied to the three-body decays. The calculated value of B(D exp + implies pi exp + pi exp + K exp -) reproduced considerably well the experimental value, but this method is not suc-

cessful in the other three-body decays of D mesons. The branching ratios for these decays calculated by assuming that quasi two-body decays contribute dominantly to these decays are almost consistent with the known data. (Atomindex citation 13:660821)

DE82701456 PC **A02**/MF **A01**
Hiroshima Univ., Takehara (Japan). Research Inst. for Theoretical Physics.
Properties of Hadronic Matter.
T. Tati. Feb 81, 9p RRK-81-3
U.S. Sales Only.

Striking features peculiar to hadronic interactions, that is, the spectrum of resonances, duality and the quark-line rule (OZI rule) observed in accelerator experiments and the spectrum (M/sub n/ asymptotically equalds (2 to 3) GeV x 10/sup n/, n = 0, 1, 2) and new varieties (Centauro, Mini-Centauro, Geminion) of fireballs found in cosmic ray experiments are interpreted qualitatively in terms of a model of hadronic matter of which hadrons are made. And, the properties and the production and annihilation mechanism of the hadronic matter are inferred from the experimental facts. A characteristic of the model is a cutoff of the momentum degree of freedom of basic particles referring to a universal timelike vector. If this is really the case, fireballs with very large Lorents-factors should reveal peculiar properties in cosmic ray experiments. Those peculiar properties of fireballs cannot be observed in colliding-beam experiments where the Lorentz-factors of the fireballs are not sufficiently large. (Atomindex citation 13:660822)

DE82701457 PC **A02**/MF **A01**
Hiroshima Univ., Takehara (Japan). Research Inst. for Theoretical Physics.
Parity Nonconserving Asymmetry in p-p Scattering Up to 6 GeV/C.
T. Oka. Mar 81, 23p RRK-81-4
U.S. Sales Only.

A parity nonconserving asymmetry in proton-proton scattering is studied. We calculate the longitudinal analyzing power for the momentum of incident proton up to P/sub L/-6 GeV/c. For the weak matrix element, we adopt one-boson-exchange interactions coming from vector mesons (rho exp 0 and omega) as well as Z-boson. (Atomindex citation 13:660823)

DE82701458 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Eta Meson Problem: Eta Implies pi exp 0 gamma gamma Decay.
F. Bion, K. Brikman, and M. Guanehr. 1981, 8p IFVE-OEF-81-12, SERP-E-140
In Russian.
U.S. Sales Only.

The experiments on search for the eta implies pi exp 0 gamma gamma decay have been carried out with the sensitivity, some tens times higher than that in the papers, reporting earlier on the observation of this decay. The measurements have been performed at the IHEP 70-GeV accelerator using the GAMS-2000 hodoscope gamma -spectrometer. It is shown that eta implies pi exp 0 gamma gamma decay had not been observed in previous experiments. The upper limit for its partial width is obtained (90% C.L.): BR(eta implies pi exp 0 gamma gamma) < 3 x 10 exp -3 . (Atomindex citation 13:660875)

DE82701459 PC **A03**/MF **A01**
Institute of Nuclear Physics, Krakow (Poland).
Three Pion Coherent Production in pi -D Interactions at 21 GeV/C.
K. Dziunikowska, A. Eskreys, and P. Malecki. 1980, 43p INP-1101/PH
U.S. Sales Only.

An analysis of 3 pi coherent production in the reaction pi exp - d implies pi exp - pi exp - pi exp + d at 21 GeV/c, using a sample of 4552 events is presented. We find the cross section for the process is 517 +- 27 mu b, and discuss the effective mass distribution of the 3 pi , 2 pi , and d pi systems. The 3 pi mas distribution is dominated by the A sub 1 enhancement, with no evidence for A sub 2 production and only a shoulder at the A sub 3 . The 2 pi mass distributions are dominated by rho and f production. The d* effect is seen only in the (beam-like) d pi exp - combination, and does not behave like a genuine resonance. A three particle partial wave (Ascoli) analysis of the data confirms previous observations that although the A sub 1 and A sub 3 can be associated with single spin states, their resonance character is not established. The A sub 2 state does not occur, and this provides evidence in favor of the Gribov-Morrison rule. (Atomindex citation 13:660876)

DE82701460 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Experimental Results on pi exp -12 C Interactions at P/sub pi exp - /40 GeV/C and the Kalinkin-Shmonin Model.
T. Kanarek, V. B. Lyubimov, M. I. Solov'ev, D. Tuvdendorzh, and M. K. Suleimanov. 1979, 11p JINR-R-1-12438
In Russian.
U.S. Sales Only.

The applicability of representations developed by Kalinkin and Shmonin is discussed taking as an example experimental results on pi exp -12 C interactions at P/sub pi exp - / = 40 GeV/c. Qualitatively considered are the problems related to invariancy of the mean transverse momentum of particles produced, behaviour of partial inelasticity coefficients with properties of fast and slow components of particles produced. Model calculations are performed and multiplicity distributions of produced in pi exp -12 C interactions pi exp +- -mesons, protons, correlations between the average number of pi exp +- -mesons and the number of protons are obtained. Distributions of longitudinal rapidities for charged pi -mesons are calculated. A good agreement between calculations and experiment is observed. (Atomindex citation 13:660877)

DE82701461 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Space-Time Characteristics of Radiation Region of Secondary Negative Pions Produced in pi exp - p Interactions at 40 Gev/C.
N. Angelov, N. Akhababyan, V. G. Grishin, and M. Koval'ski. 1981, 12p JINR-R-1-81-190
In Russian.
U.S. Sales Only.

The dimensions of radiation region of secondary pions produced in pi exp - + p implies pi sub 1- + pi sub 2- + X interactions at 40 GeV/c are investigated by the method of interference of identical particles. The obtained results indicate, that for the space-time description of particle source in the c.m.s. it is necessary to introduce two dimensions: r sub 1 approximately equal to 3 Fm and r sub 2 approximately equal to 1 Fm. This conclusion is confirmed for different models of the source distributions. (Atomindex citation 13:660878)

DE82701465 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation.
Statistical Simulation of Internuclear Cascades Produced by High Energy Particles.
V. S. Barashenkov. 1981, 5p JINR-R-2-81-364, CONF-8110170-1
In Russian.All-union conference on ionizing radiation protection of nuclear installations, Tbilisi, USSR, 1 Oct 1981.
U.S. Sales Only.

Monte-Carlo modelling of internuclear cascades in the region of high and extremely high energies on the basis of the intranuclear cascade model is discussed. Such an approach is applicable up to a few ten GeV energies. For high energies it is necessary to take into account deviations from the commom model of intranuclear cascades. (Atomindex citation 13:660901)

DE82701466 PC **A02**/MF **A01**
International Centre for Theoretical Physics, Trieste (Italy).
Relativistic Calculation of Polarized Nuclear Matter.
M. Y. M. Hassan, and H. M. M. Mansour. Aug 79, 9p IC-79/107
U.S. Sales Only.

The binding energy of nuclear matter with excess of neutrons, of spin-up neutrons, and spin-up protons (characterized by the corresponding parameters, alpha /sub tau/ = (N-Z)/A, alpha /sub N/ = (N-N)/A, and alpha /sub p/ = (Z-Z)/A)), contains three symmetry energies: the isospin symmetry energy epsilon/sub sigma/, the spin symmetry energy epsilon/sub sigma/ , and the spin-isospin symmetry energy epsilon/sub sigmatau/. The relativistic corrections to epsilon/sub tau/, epsilon/sub sigma/ and epsilon/sub sigmatau/ are found to be -2.06, -2.6, and -0.89 MeV, respectively. The relativistic correction to the compression modulus is -10.8 MeV. (Atomindex citation 13:660907)

DE82701467 MF **A01**
International Centre for Theoretical Physics, Trieste (Italy).
Thermal Properties of Polarized Nuclear Matter.
M. Y. M. Hassan, S. S. Montasser, and S. Ramadan. Aug 79, 15p IC-79/133
U.S. Sales Only. Available in microfiche only.

The thermal properties of polarized nuclear matter are calculated using Skyrme III interaction modified by Dabrowski for polarized nuclear matter. The temperature dependence of the volume, isospin, spin and spin isospin pressure and energies are determined. The temperature, isospin, spin, and spin isospin dependence of the equilibrium Fermi momentum is also discussed. (Atomindex citation 13:660908)

DE82701468 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Isospin Splitting of Giant Dipole Resonance in exp 13 C.
M. N. Kirchbach. 1981, 4p JINR-E-4-81-283
U.S. Sales Only.

Wave functions for abnormal parity states in exp 13 C are used to investigate the absorption cross section of the reaction exp 13 C(gamma , n). Wave functions are calculated in the subspace of all non-spurious 1h omega -excitations by means of a noncentral particle-hole ph interaction. Noncentral components of the ph interaction are shown to be necessary for obtaining a realistic isospin structure and correct positions of the giant dipole resonance peaks in exp 13 C. (Atomindex citation 13:660910)

DE82701469 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics.
Properties of the pi -Condensate Phase Transition for Finite Temperature.
G. G. Bunatyan, and I. N. Mishustin. 1981, 11p JINR-R-2-81-500
In Russian.
U.S. Sales Only.

It is demonstrated that depending on the nature of the pi pi -interaction in nuclear matter the pi -condensate phase transition of the first or second kind is possible. The estimates of the critical density rho tilde/sub c/(T) and the condensate field are obtained. It is proved that the availability of the thermal fluctuations leads to the increase of the critical density by the value delta rho/sub c/(T), which is growing fast with temperature, so as for T not equal to 0 the nuclear matter becomes more stable with reference to pi -condensation. The possibility is discussed of the experimental observation of the consequences of the pion field fluctuation increase near the critical point. (Atomindex citation 13:660911)

DE82701470 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Physique Nucleaire.
Formation and Decay of Light Medium Systems Studied by Combined Particle and gamma Techniques.
H. Dumont, E. Bozek, and B. Delaunay. May 81, 12p CEA-CONF-5829, CONF-810563-14
Adriatic europhysics study on nuclear physics dynamics of heavy-ion collisions conference, Croatis, Yugoslavia, 25 May 1981.
U.S. Sales Only.

An attempt is made to check how reliable is the statistical model for light medium systems (A approximately 50 to 70, E/sub inc/ = 1 to 2 Coulomb barrier, induced by light heavy ions) to predict the whole range of observable quantities in a coherent way. For that purpose, evaporation residue yields, excitation functions, fusion cross sections, energy spectra and angular distributions of light and heavy particles were measured. The results were compared with the predictions of the new version of the evaporation code CASCADE which allows to calculate the CN decay not only by n, p, alpha and gamma -emission, but also by an optional additional decay channel. Although, as expected, the com-

pound formation and decay is the dominant mechanism, a significant (approximately 15%) contribution of non fusion processes is observed. Preliminary calculations based on the DWBA formalism, using the diffractional model to fit the continuum energy spectra of the direct reactions give a reasonable account of the observed transfers. It is shown that combination of charged particles and gamma -rays spectroscopy techniques can be useful in such studies. (Atomindex citation 13:660939)

DE82701471 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
Excitation of Giant Resonances in Inelastic Scattering of 93 MeV exp 6 Li Ions.
N. I. Venikov, Yu. A. Glukhov, and A. S. Dem'yanova. 1980, 20p IAE-3352/2
In Russian.
U.S. Sales Only.

Regions of the quadrupole (E/sub x/ approximately 63A/sup -1/3/ MeV) and octupole (E/sub x/ approximately 30A/sup -1/3/ MeV) giant resonances in exp 12 C, exp 90 Zr, exp 120 Sn, and exp 197 Au nuclei have been investigated by inelastic scattering of 93 MeV exp 6 Li ions. The angular distributions obtained for exp 90 Zr and exp 120 Zn resonance groups have been analyzed according to the method of distorted waves. Detail investigation into the group at E/sub x/ approximately 63A/sup -1/3/ MeV testifies to the existence of the monopole giant resonance which is located on the left wing of the quadrupole resonance at an excitation energy of approximately 76A/sup -1/3/ MeV. (Atomindex citation 13:660943)

DE82701472 MF **A01**
Institute of Nuclear Physics, Krakow (Poland).
Collective Processes in Heavy-Ion Collisions with Atomic Nuclei. Dissipation of Energy and Angular Momentum.
J. Kuzminski. 1980, 107p INP-1085/PL
In Polish.
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

The collective processes in collision of heavy-ions with atomic nuclei are discussed. Measured data on the S + Ti collision at E/sub LAB/ = 105, 130, and 144 MeV have been analysed in terms of a fission-like processes which seem to be a special case of deep inelastic collisions whose total available kinetic energy is completely dissipated. Applying transport theory it was possible to introduce a clock for measuring the time scale of nuclear processes in collision of heavy-ions by measuring the FWHM of mass distribution of emitted reaction products. Experimental data on continuum gamma spectra from Cu + Au collision at E/sub LAB/ = 400 MeV are presented and the angular momentum dissipation in this reaction is discussed. (Atomindex citation 13:660944)

DE82701473 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics.
Peculiarities of the Deviation from the 1/V Law of the exp 3 He(N,p)T Reaction Cross Section. 0 exp + Level of exp 4 He.
S. B. Borzakov, Kh. Maletski, L. B. Pikel'ner, M. Stehmpin'ski, and E. I. Sharapov. 1981, 13p JINR-R-3-81-305
In Russian.
U.S. Sales Only.

Effective cross section of the exp 3 He(n,p)T reaction has been measured within the 0.15 to 150 keV energy range with the (2 to 3)% accuracy. Basing on the analysis of cross section deviation from the 1/v law parameters of the first excited level of exp 4 He nucleus are determined. For the reduced proton and neutron level width ratio the value gamma /sub p/ exp 2 / gamma / sub n/ exp 2 = 1.45/sub -0.06//sup +0.09/ is obtained. The upper estimate for contribution the 1 exp + spin channel into cross section with spin I exp + is defined more accurately. (Atomindex citation 13:660946)

DE82701474 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Study on the exp 162 Tm Excited States at the exp 162 Yb (T/Sub 1/2/ = 18.9 Min) Decay.
I. Adam, A. Budzyak, and Z. Gons. 1981, 14p JINR-R-6-81-457
In Russian.
U.S. Sales Only.

The decay of exp 162 Yb (T/sub 1/2/ = 18.9 min) has been investigated with Ge(Li)- and Si(Li)-detectors, beta-spectrograph and beta-spectrometer with toroidal magnetic field. The single gamma spectrum, the conversion electron spectrum, gamma-gamma- and electron-gamma-coincidences spectra have been measured. In all, 45 gamma transitions have been observed. The decay scheme for exp 162 Yb is proposed involving 18 excited states in exp 162 Tm, 16 of which were previously unknown. (Atomindex citation 13:660947)

DE82701475 PC **A03**/MF **A01**
Jyvaeskylae Univ. (Finland). Dept. of Physics.
Medium-Spin Levels and the Character of the 20.4 Ns 13/2 exp + Isomer in exp 145 Gd.
A. Pakkanen, J. Muhonen, M. Piiparinen, and J. Blomqvist. Jun 81, 30p JYFL-RR-5/81
U.S. Sales Only.

Levels of the N = 81 nucleus exp 145 Gd have been investigated by in-beam gamma -ray and conversion electron spectroscopy with the exp 144 Sm(exp 3 He,2n) reaction. Fourteen new low- and medium-spin states between 1.0 and 2.4 MeV excitation, the known yrast levels up to spin (21/2) exp + , five other high-spin non-yrast states and a new 20.4 ns (13/2) exp + isomer at 2200.2 keV in exp 145 Gd have been observed. The isomer decays via a fast 927.3 keV E3 transition with B(E3) = 48 +- 7 W.u. Another weaker decay branch is a mixed, strongly hindered E1 + M2 + E3 transition to the nu h/sub 11/2/ exp -1 state. We propose an octupole nu f/sub 7/2/j sub 0-2 x 3 exp - main configuration for the isomer, analogous to the 997 keV (13/2) exp + isomer in exp 147 Gd. The levels of exp 145 Gd are discussed on the basis of the spherical shell model. (Atomindex citation 13:660948)

DE82701476 PC **A02**/MF **A01**
Akademiya Nauk URSR, Kiev. Inst. Yadernykh Issledovanii.
Decay of Isomers of the /Sup 103-109/IN Odd Neutron-Deficient Nuclei.
I. N. Vishnevskii, V. A. Zheltonozhskii, V. P. Svyato, and V. V. Trishin. 1981, 10p KIYI-81-5
In Russian.
U.S. Sales Only.

A detection of new isomer of the neutron-deficient exp 103 In and research of new isomeric states of the /sup 105-109/In odd nuclei were reported. A comparison was carried out for the measured probabilities of M4-transitions from the isomeric levels with one-particle values. A correlation of these values with neutron position in 2d exp 5 /2 and lg exp 7 /2 subshells was marked. (Atomindex citation 13:660949)

DE82701477 PC **A03**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Sukhumi. Fiziko-Tekhnicheskii Inst.
Measurement of Atom Masses in the 79 (<=) A (<=) 87 and 103 (<=) A (<=) 115 Range.
R. A. Demirkhanov, V. V. Dorokhov, M. I. Dzkuya, and G. A. Dorokhova. 1981, 30p SFTI-1(1981)
In Russian.
U.S. Sales Only.

Masses of all the stable isotopes of bromine, krypton, rubidium (79<=A<=87) and masses of rhodium, palladium, silver, cadmium, and indium isotopes (103<=A<=115) have been measured by the mass-spectrographic method. Mass-spectrograph having double focusing and a resolution of 70,000 to 90,000 was used in the measurements. 204 basic doublets have been measured and masses of 29 stable isotopes have been determined by their means in the above regions. Relative accuracy of measurements is delta M/M approximately equal to 1 x 10 exp -7 . Values of the masses agree with the Ries data within the limits of total error. However, there is a significant discrepancy with the Kollins and Halsted data which is attributed to the presence of unrevealed systematical errors in some measurement in the range of 30 to 70 keV. (Atomindex citation 13:660950)

DE82780451 PC **A04**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Angewandte Kernphysik 2.
Exp 176 Lu: Cosmic Clock or Stellar Thermometer.
R. A. Ward, H. Beer, F. Kaeppeler, and K. Wisshak. Dec 80, 59p KFK-3094
U.S. Sales Only.

We quantitatively examine the various experimental and theoretical aspects of the stellar synthesis of the long-lived ground state of exp 176 Lu (3.6 x 10 exp 10 y). We discuss the various regimes of stellar temperature and free-neutron density in which either: (i) the internal electromagnetic couplings between exp 176 Lu/ sup o/ and exp 176 Lu/sub m/ (3.68 hours) are sufficiently slow that they may be treated as separate nuclei, or (ii) the internal couplings are rapidly able to establish thermal equilibrium between exp 176 Lu/sup o/ and exp 176 Lu/sup m/. (ERA citation 07:045158)

DE82780457 MF **A01**
National Lab. for High Energy Physics, Oho (Japan).
Proceedings of the 1979 KEK Summer Schoo, Tsukuba ...
M. Kobayashi, S. I. Kurokawa, A. Suzuki, and T. Yukawa. Mar 80, 322p KEK-79-33, CONF-7908168-
KEK summer school, Oho, Japan, 10 Aug 1979.
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

Individual items from the conference were prepared separately for the data base.

DE82780467 PC **A04**/MF **A01**
Technische Univ. Muenchen, Garching (Germany, F.R.). Physik-Dept.
Determination of Reaction Cross Sections with the Aid of alpha Decay in the exp 12 C, exp 14 C + exp 209 Bi Reactions.
H. Hick. 28 Jan 80, 70p INIS-mf-6899
In German.Thesis.
U.S. Sales Only.

For the reactions exp 14 C + exp 209 Bi and exp 12 C + exp 209 Bi excitation functions at energies in the range between 57 MeV and 76 MeV are measured. Radiative capture and particle evaporation cross sections were determined by means of alpha -spectroscopy, and fission cross sections were determined by the measurement of the gamma -radiation after the beta -decay of the fission products. For the radiative capture for the reaction exp 14 C + exp 209 Bi upper limits for the cross section from 21 nbarn to 178 nbarn in the energy interval 61-74 MeV were determined. The fission cross sections were 80 +- 30 mbarn at 490 +- 200 mbarn at 76 MeV. For the reaction exp 12 C + exp 209 Bi three new alpha -lines were found. They were due to the slope at their excitation functions assigned to the decay of isomeric states of following nuclei: exp 219 Ac Esub(alpha) = 9419 +- 4 keV Tsub(1/2) = 830 +- 100/ mu sec, exp 218 Ac Esub(alpha) = 9271 +- 4 keV Tsub(1/2) = 810 +- 70/ mu sec, exp 217 Ac E alpha = 9730 +- 5 keV Tsub(1/2) = 970 +- 190/ mu sec. For the reactions respectively exp 12 C + exp 209 Bi calculations using the statistical model code Grogi of J. Gilat are performed. The calculated branchings of the evaporation channels were compared with the experiment. (Atomindex citation 13:658368)

DE82780468 MF **A01**
Technische Hochschule, Darmstadt (Germany, F.R.). Fachbereich Physik.
Elastic and Highly Damped Collisions in the exp 40 Ar + exp 40 Ca System at Energies Esub(Lab) = 191, 236, and 272 MeV.
P. Wastyn. 13 Feb 80, 103p INIS-mf-6904
In German.Thesis.
U.S. Sales Only. Available in microfiche only.

At the UNILAC accelerator of the GSI in Darmstadt the cross sections for elastic scattering and deep inelastic collisions of exp 40 Ar from exp 40 Ca in the angular range deltasub(lab) = 10 exp 0 -50 exp 0 were studied at energies Esub(lab) = 191, 236, and 272 MeV. (Atomindex citation 13:658369)

DE82901233 PC **A02**/MF **A01**
British Columbia Univ., Vancouver. TRIUMF Facility.
Summary of the Discussion on Connections among Models of Pion Production.
H. W. Fearing. Dec 81, 5p TRI-PP-81-74, CONF-8110152-6
AIP conference on pion production and absorption in nuclei, Bloomington, IN, USA, 22 Oct 1981.
U.S. Sales Only.

A panel of experts, together with members of the audience, discussed the general subject of connections among the various models of the (p, pi) reaction which

were described at the conference and some of the difficulties with these and other models. Members of the panel included Prof. Hugh McManus of Michigan State University, Prof. James Vary of Iowa State University and Prof. George Walker of Indiana University. This brief summary gives some idea of the flavor of the presentations of the panelists and of the discussion which followed. No attempt has been made to record all of the comments verbatim. Some have been paraphrased, some omitted, and some interpreted. (ERA citation 07:045038)

N82-28149/4 PC **A05**/MF **A01**
Zentralinstitut fuer Kernforschung, Rossendorf bei Dresden (German D.R.)
Behaviour of Rapidly Rotating Nuclei.
Ph.D. Thesis.
S. Frauendorf. Oct 80, 86p ZFK-409

The Hartree-Fock-Bogoljubob equations in the rotating frame (Cranking model) are used to describe the behavior of rapidly rotating nuclei. The rotation is expected to predominantly change the single particle motion, the pair correlations and the nuclear shape. The quasiparticle motion in a rotating potential is extensively discussed. The symmetry quantum numbers, parity and signature are used for the classification of the levels. The angular frequency plays a key role. Its experimental determination is discussed. The experimental excitation energy and angular momentum of the quasi-particles are defined. The experimental specra may be understood in terms of configurations of independent quasi-particles. The disappearance of pair configurations due to rotation is analyzed. The fluctuations of the pair field stabilize the correlations. The transition to the unpaired state consists of few jumps due to the break up of individual nucleon pairs. The calculated nuclear shape remains approximately unchanged in a large interval of angular momentum. At high momenta it jumps to larger deformation. This reflects how the shell structure influences the deformation energy.

PB82-252800 PC **A03**/MF **A01**
Science and Engineering Research Council, Chilton (England). Rutherford Appleton Lab.
Depolarisation Effects in Resonance Absorption Neutron Polarising Filters.
J. Mayers. c1982, 29p RL-82-046

The depolarization of a neutron beam passing through a system of magnetically misaligned single domain particles is examined and simulated using a Monte-Carlo program. The results of the simulations are in excellent agreement with those of analytic calculations within the regimes where such calculations are applicable. The simulations have been used in the estimation of the polarizing efficiency and transmittance of a resonance absorption filter containing partially aligned particles of SmCo5. It is shown that the application of strong magnetic fields (about 2T) should significantly improve the filter performance. A method of measuring this improvement is suggested. (Copyright (c) Science and Engineering Research Council 1982.)

PB82-253345 PC **A03**/MF **A01**
Oxford Univ. (England). Nuclear Physics Lab.
Hadron Production in e+e- Annihilation.
Final rept.,
R. Cashmore. 1982, 48p OU/NPL-12/82

The basis of a working model was reviewed for the description of the single-photon annihilation process for hadronic production in e(+)e(-) collisions, particularly at the high energies now available with the present storage rings. Considered in this were the total annihilation cross-section, multiplicity and neutral energy fractions, quark jets and their fragmentation properties, and multijet events, gluons and quantum chromodynamics (QCD). The conclusions were that the major process is quark-antiquark pair production; these quarks are pointlike, have spin 1/2, 3 colors and 5 flavors and are produced at a rate proportional to the squares of their charges. These quarks radiate gluons, of spin 1 and coupling constant (alpha sub s) about 0.12 to 0.17.

20I. Plasma Physics

AD-A117 765/8 PC **A03**/MF **A01**
AMAF Industries, Inc., Columbia, MD.
Experimental Investigation of Neutral Plasma Beam Propagation Across a Magnetic Field.
Final rept. 15 Feb 81-14 Feb 82,
Carl Spight. 14 Apr 82, 44p 8205-X4300-200, AFOSR-TR-82-0590
Contract F49620-81-C-0021

The conversion, described herein, of a pre-existing Hypervelocity Plasma Generator Facility to operate in a regime of importance to particle beam research has been completed. The facility is now capable of producing a plasma flow-magnetic field environment that in a scaled manner simulates the exoatmospheric propagation of a plasmoid across the geomagnetic field. A full set of flow and field diagnostics have been implemented and calibrated. It includes magnetic field probes for the slowly varying transverse background and the fast varying motionally induced fields, a laser schliren system for monitoring density gradient structure of the beam and time-of-flight fast photodiode probes for beam velocity measurements. Port access is available for monitoring directly electrostatic or electromagnetic fields associated with beam propagation. In tandem with experimental activity a theoretical analysis effort has been initiated, in interaction with theoreticians at Los Alamos National Laboratory, which intends a significant contribution to the stability analysis of a bounded plasma beam which can exhibit polarization and/or diamagnetic effects. No satisfactory theory or numerical simulations are currently available for that intrinsically three-dimensional dynamics. (Author)

AD-A117 862/3 MF **A01**
Colorado Univ. at Boulder.
Plasma Wave Turbulence and Particle Heating Caused by Electron Beams, Radiation and Pinches.
Interim rept. 1 Oct 80-30 Sep 81,
Martin V. Goldman. May 82, 272p CU-1533143, AFOSR-TR-82-0592
Grant AFOSR-80-0022
Availability: Microfiche copies only.

This interim report covers research performed from October 1, 1980 through September 30, 1981 on electron-beam excited plasma turbulence and electromagnetic emission, on propagation of intense electromagnetic radiation in the earth's ionosphere, on plasma diagnostics, and on experiments to accelerate ions and excite low frequency turbulence in the laboratory. (Author)

AD-A117 896/1 PC **A03**/MF **A01**
Maryland Univ., College Park. Dept. of Electrical Engineering.
Experimental and Theoretical Investigation of Microwave and Millimeter Wave Radiation from Hollow, Rotating, Electron Beams.
Annual rept. 1 Dec 79-30 Nov 81,
William W. Destler, R. L. Weiler, and Charles D. Striffler. Nov 81, 34p AFOSR-TR-82-0532
Grant AFOSR-78-3690

During this period this effort has explored the scaling of the negative mass instability to regimes associated with smaller plasmas and short wavelengths for the plasma-produced radiation. An experimental apparatus for these studies is near completion. The nonlinear electromagnetic interaction between the collective/bunches of electrons and the radiation field has been formulated in an attempt to derive the efficiency of the production of radiation. In addition, the Dragon electron beam source is currently being improved for future radiation production experiments based on the negative mass instability. Experimental efforts at high powers have resulted in the enhancement of radiation at a single frequency. This last effort has utilized a 'double-magnetron cavity' to enhance the radiation power in Ka band at 26 and 41GHz. (Author)

AD-A117 900/1 PC **A02**/MF **A01**
Naval Research Lab., Washington, DC.
Microwave Energy Coupling in a Nitrogen Breakdown Plasma.
Memorandum rept.,
C. L. Yee, A. W. Ali, and W. M. Bollen. 10 Aug 82, 23p Rept no. NRL-MR-4869

Computer simulations of microwave coupling to a nitrogen breakdown plasma have been performed at 25 Torr. Non-hydrodynamic ionization fronts are observed to propagate toward the radiation source under a variety of circumstances. Free nitrogen breakdown simulations in a spherical system show the propagation velocity of the breakdown wave can be as high as 5 x 10 to the 6th power cm/sec. An elementary theory is used for estimating the speed of the breakdown wave in one dimension. The results are in resonable agreement with breakdown experiments. (Author)

DE82008441 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge.
Excitation of Quasi-Electrostatic Modes in a Magnetized Plasma by a Modulated Hollow E-Beam.
A. Ezzeddine, and L. D. Smullin. Jan 82, 25p DOE/ET/51013-28, PFC/RR-82-1
Contract AC02-78ET51013
Portions of document are illegible.

The power radiated into the modes of an infinite magnetized plasma by a modulated hollow electron beam is calculated for the cases of cold and warm plasmas. The beam is assumed to be sinusoidally density modulated and the induced fluctuating electric field is strong enough to quench any beam plasma interaction. Numerical results are presented for the power deposited into the plasma at frequencies near the lower hybrid frequency for different beam plasma parameters. (ERA citation 07:052280)

DE82012758 PC **A04**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Ballooning Mode Spectrum in General Toroidal Systems.
R. L. Dewar, and A. H. Glasser. Apr 82, 64p PPPL-1890
Contract AC02-76CH03073

A WKB formalism for constructing normal modes of short-wavelength ideal hydromagnetic, pressure-driven instabilities (ballooning modes) in general toroidal magnetic containment devices with sheared magnetic fields is developed. No incompressibility approximation is made. A dispersion relation is obtained from the eigenvalues of a fourth order system of ordinary differential equations to be solved by integrating along a line of force. Higher order calculations are performed to find the amplitude equation and the phase change at a caustic. These conform to typical WKB results. In axisymmetric systems, the ray equations are integrable, and semiclassical quantization leads to a growth rate spectrum consisting of an infinity of discrete eigenvalues, bounded above by an accumulation point. However, each eigenvalue is infinitely degenerate. In the nonaxisymmetric case, the rays are unbounded in a four dimensional phase space, and semiclassical quantization breaks down, leading to broadening of the discrete eigenvalues and accumulation point of the axisymmetric case into continuum bands. Analysis of a model problem indicates that the broadening of the discrete eigenvalues is numerically very small, the dominant effect being broadening of the accumulation point. (ERA citation 07:045304)

DE82701192 PC **A03**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Stability Analysis of INTOR. IAEA INTOR Workshop Report: Phase I, Physics, (1).
T. Takeda, K. Itoh, and M. Azumi. Apr 81, 38p JAERI-M-9466
U.S. Sales Only.

Stability of the INTOR plasma is investigated from various viewpoints. Instabilities considered in this article are positional instaility, low-n kink and internal mode instabilities, high-n ballooning mode instability and resistive instability. Considering that the high-n ballooning mode instability is very important from the viewpoint of the beta optimization it is investigated minutely. Possibility of attaining a very high beta equilibrium in the second stable region of the ballooning instability is presented. Both the MHD and kinetic approaches are adopted to understand the behavior of the INTOR plasma comprehensively. (Atomindex citation 13:657900)

DE82701423 PC **A03**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Dynamics of Two-Dimensional Solitary Vortices in a Low- beta Plasma with Convective Motion.
M. Makino, T. Kamimura, and T. Taniuti. Dec 80, 31p IPPJ-496
U.S. Sales Only.

Numerical studies of the Hasegawa-Mima equation, derived in the context of drift waves but equivalent to the quasigeostrophic vortex potential equation for Rossby waves, show the stable properties of solitary vortices which are two dimensional, localized, steady

and translating solutions of this same equation. A solitary vortex can propagate only in the direction (x-direction) perpendicular to the density gradient. When this solitary vortex solution is inclined at some angle with respect to the x-axis, its propagation direction oscillates in the x and y plane. In two dimensional collisions, i.e. head-on collision and overtaking, solitary vortices interact two-dimensionally and recover their initial shapes at the end of both types of collisions. (Atomindex citation 13:660545)

N82-28169/2 PC **A03**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Cross Sections for One-Electron Capture by Highly Stripped Ions of Be, B and C from H2 and Ar Below 10 Kev.
S. Takagi, S. Ohtani, K. Kadota, and J. Fujita. Mar 82, 31p IPPJ-565

Measured cross sections for one-electron capture by highly stripped ions of Be, B and C from H2 and Ar at low energies below 10 keV are nearly independent of the collision energy investigated. The distinct oscillation with incident ionic charge q in the cross sections are observed.

N82-28170/0 PC **A03**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Collision Experiment on Highly Ionized Ions Using Vacuum Spark Source.
S. Takagi, S. Ohtani, K. Kadota, and J. Fujita. Mar 82, 29p IPPJ-564

Cross sections for one-electron capture by Fe (6+) in H2 are measured below 10 keV by using a vacuum spark ion source. It is found that the cross sections show little dependence on the collision energy and this value is about 6 x 10 to the minus 15th power/sq cm. This ion source, which has no electrode for ion extraction, can produce ions from several hundreds eV to several tens of keV and the maximum charge state of 16 in Fe at 125J discharge energy. With ion selection system of 2.7m time-of-flight and an electrostatic analyzer of 1% resolving power, 100 to 1,000 ions/pule are obtained. Because of poor reproducibility of ion beam, charge-transferred ions and unreacted ions are simultaneously with a microchannel plate which has two anodes behind. By utilizing the feature of pulsed ion beam and this ion selection system, it is possible to obtain cross sections for various charge states of ions simultaneously.

N82-28171/8 PC **A02**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Population Inversion and Threshold Condition for Laser Oscillation in Optically Thin and Thick Recombining Plasmas.
T. Oda, and U. Furukane. Mar 82, 25p IPPJ-563

Overpopulation density (difference between the population densities per unit statistical weight of the upper and lower excited levels) is calculated as a function of the electron density for various electron temperatures in recombining hydrogen plasmas. The calculation is made for the line pairs with the principal quantum numbers, (2,3), (3,4) and (4,5). Effect of the ground level population density (n sub 1) on the overpopulation density is calculated. In this calculation the atom-atom collision and the self-absorption of the resonance lines are considered. The n sub 1 dependence of the overpopulation density remains almost constant until the self-absorption becomes significant. When n sub 1 is zero, an optimum value of the electron density for the overpopulation density. The threshold condition for laser oscillation is discussed in relation to the calculated overpopulation density. Laser oscillation is possible for the line pair (2,3) at an electron density and temperature higher than for the other pairs (3,4) and (4,5) when the self-absorption is negligible.

N82-28172/6 PC **A03**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Stochastic Motion of Particles in Tandem Mirror Devices.
Y. H. Ichikawa, T. Kamimura, and C. F. F. Karney. Mar 82, 37p IPPJ-562

The stochastic motion of collisionless guiding centers in tandem mirror devices is analyzed in terms of a nonlinear mapping of particle positions on the equatorial plane. Local stability analysis determines the appearance of various patterns of particle trajectories. Numerical observation of adial motion of particles makes it possible to estimate the rate of stochastic diffusion.

N82-28173/4 PC **A04**/MF **A01**
Innsbruck Univ. (Austria). Inst. for Theoretical Physics.
Studies of Plasma Anisotropy.
L. Lewin. Jun 82, 51p UNICP-FSP-82/1
Sponsored in Part by Fonds Zur Foerderung der Wissenschaftlichen Forschung and the Austro-American Education Commission.

Various combinations of anisotropy with homogeneous and inhomogeneous plasma density, and with curvature, for guides of circular and rectangular cross section were attempted. The mathematical difficulties are considerable but examples are examined which, between them, strongly suggest the following conditions for the axisymmetric torus mode resonance frequency: (1) curvature has relatively little effect; (2) anisotropy has little effect except close to ion cyclotron resonance; (3) for dense and radially varying plasmas the mean plasma density largely determines the resonance.

N82-28178/3 PC **A02**/MF **A01**
Stichting voor Fundamenteel Onderzoek der Materie, Rijnhuizen (Netherlands). Inst. voor Plasma-Fysica.
Ideal Mhd Equilibrium of a Weakly Toroidal Plasma Column with Elongated Cross-Section. Part 2: Force-Free Fields.
E. J. M. Vanheesch, and W. Schuurman. Jul 80, 16p RIJNHUIZEN-80-124
Prepared in Cooperation with Stichting voor Fundamenteel Onderzoek der Materie, Jutphaas.

Solutions are obtained of the ideal MHD equations describing the equilibrium of a weakly toroidal plasma with an elliptic cross-section surrounded by a force-free magnetic field with constant ratio between current density and magnetic field strength. The force-free field parameter causes the stagnation points to recede along the major axis of the ellipse. Above a certain value of the force-free field parameter, stagnation points do not exist, so that the compression ratio of the plasma column is no longer limited. The analysis was carried out to first order in the force-free parameter as well as to second order for an estimate of the error.

N82-28179/1 PC **A03**/MF **A01**
Stichting voor Fundamenteel Onderzoek der Materie, Rijnhuizen (Netherlands). Inst. voor Plasma-Fysica.
Cyclotron Radiation from Thermal and Non-Thermal Electrons in in the Wega-Stellarator.
H. W. Piekaar, and W. R. Rutgers. Nov 80, 26p RIJNHUIZEN-80-128
Prepared in Cooperation with Stichting voor Fundamenteel Onderzoek der Materie, Jutphaas.

Electron cyclotron radiation measurements on the WEGA-stellarator are reported. Emission spectra around 2(NU)sub(ce) and 3(NU)sub(ce) were measured with a farinfrared spectrometer and InSb detectors. Runaway particles can be removed by increasing the plasma density. For low loop voltage discharges the electron temperature profile was deduced from thermal emission around 2(NU)sub(ce). In spite of the low E-field, runaway particles are still created and pitch angle scattered because (NU)sub(pe)/(NU)sub(ce) approximately 1. From nonthermal emission below 2(NU)sub(ce) and 3(NU)sub(ce) the energy and number of particles are calculated, and are in agreement with existing theories.

N82-28181/7 PC **A03**/MF **A01**
Stichting voor Fundamenteel Onderzoek der Materie, Rijnhuizen (Netherlands). Inst. voor Plasma-Fysica.
High-(Alpha) Equilibria of Plasmas in the Quasi-Uniform Current Model: Influence of Shaping the Plasma Cross-Section and of the Second Order N the Inverse Aspect Ratio.
W. Schuurman, and C. Bobeldijk. Apr 81, 31p DE81-700759, RIJNHUIZEN-81-131
Prepared in Cooperation with Stichting voor Fundamenteel Onderzoek der Materie, Jutphaas.

Toroidal plasma equilibria in the high-(ALPHA) ordering in the quasuniform current model, varying the shape of the poloidal plasma cross-section were analyzed. The effect of the second order in an expansion in the inverse aspect ratio was determined for a plasma with elliptic cross section. Analytical representation of curves with a shape deviating from an ellipse (e.g., racetrack, triangle, rectangle) enabled the treatment of high-(ALPHA) equilibria of plasmas with the curves as polodial cross-section. A smooth current profile or a flat plasma cross-section allow higher values of (ALPHA) sub(p) than a skin current or a vertically pointed cross-section. The D-shaping also improves the equilibrium (ALPHA) sub(p), especially at higher values of the ellipticity. It is concluded that the method of cross-section shaping allows the extension to higher mode harmonic contributions.

N82-28183/3 PC **A03**/MF **A01**
Royal Inst. of Tech., Stockholm (Sweden). Institutionen foer Plasmafysik.
A Necessary Condition for the Critical Ionization Velocity Interaction.
N. Brenning. Feb 82, 30p TRITA-EPP-82-01, ISSN-0348-7539
Sponsored by Swedish Natural Science Research Council.

The possibility of critical ionization velocity (VC) interaction in a configuration consisting of a highly ionized plasma streaming into a region with neutral gas is discussed. The energy flow in the interaction was studied and a condition which can be used to determine whether VC interaction is energetically impossible, just possible or easily possible was derived. Parameters used are: the molecular mass, ionization potential and ionization cross section of the neutrals, the number density in and spatial extension of the region with neutral gas, and the velocity and initial electron temperature of the plasma stream. The use of the condition is illustrated by a laboratory experiment in which a hydrogen plasma stream collided with a neutral helium cloud, resulting in electron heating and braking to VC, and the fluxes of hot electrons and heavy ions recorded during the Apollo 13 Moon landing.

20J. Quantum Theory

DE82701180 PC **A02**/MF **A01**
Eotvos Lorand Univ., Budapest (Hungary). Elmeleti Fizikai Intezet.
Geometrodynamics in Multidimensional Unified Theories.
L. Szabo. May 81, 14p REU-ITP-402
U.S. Sales Only.

The unified theory of gravitation and a Yang-Mills field is formulated as a dynamic theory of (r + 3)-geometries presumed to be principal bundles with Reimannian metric. Beyond the usual constraint equations the second fundamental form should satisfy a third constraint equation. It is shown that they have a wormhole type solution describing a pair of Yang-Mills charges. (Atomindex citation 13:657535)

DE82701181 PC **A02**/MF **A01**
Eotvos Lorand Univ., Budapest (Hungary). Elmeleti Fizikai Intezet.
Phenomenological Quantum Electrodynamics of Anisotropic Media.
K. Nagy, and T. Tel. Jul 81, 24p REU-ITP-405
U.S. Sales Only.

The phenomenological quantum theory of the electromagnetic field in anisotropic dielectrics is presented. The Hamiltonian of the field is diagonalized. Its quanta can be interpreted as photons polarized in directions corresponding to the classical directions of polarization. The momentum operator, however, can not be diagonalized simultaneously, thus photons are interpreted as quasi-particles the momenta of which are given as mean values. Nevertheless, these photons are pointed out to exhibit similar properties as particles. (Atomindex citation 13:657536)

PB82-873852 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Quantum Measurement Theory. 1975-August, 1982 (Citations from the International Information Service for the Physics and Engineering Communities Data Base).
Rept. for 1975-Aug 82.
Aug 82, 113p

This bibliography contains citations concerning quantum theory of measurement. Quantum measurement design and processes, uncertainty principle, and measuring system calibration and effects are discussed. Laboratory conditions, statistical analysis, and error analysis are considered. (Contains 107 citations fully indexed and including a title list.)

20K. Solid Mechanics

AD-A117 386/3 PC **A05**/MF **A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS.
User's Guide: Computer Program for Analysis of Beam-Column Structures with Nonlinear Supports (CBEAMC).
Final rept.,
William P. Dawkins. Jun 82, 96p Rept no. WES-INSTRUCTION-K-82-6

This report documents a computer program--CBEAMC--for analysis of general beam-column structures supported and/or loaded by components which interact with the displacements of the beam and/or column. The report: (a) Describes the general beam-column system considered and the mathematical model used for analysis; (b) Presents the force-displacement relationships for the mathematical model and describes the computational procedure used for solution; and (c) Provides example solutions obtained with the program.

AD-A117 387/1 PC **A04**/MF **A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS.
A Three-Dimensional Stability Analysis/Design Program (3DSAD). Report 3. General Analysis Module (CGAM).
Instruction rept.,
Fred T. Tracy, and Charles W. Kling. Jun 82, 60p
Rept no. WES-INSTRUCTION-K-80-4
See also report dated Jun 80, AD-A087 074.

This report describes the General Analysis Module of the three-dimensional stability analysis/design (3DSAD) program. The module performs overturning, bearing (base pressure), and sliding computations for a structure. The report presents both a user's guide and a theoretical discussion for the module.

AD-A117 49[illegible]/9 PC **A02**/MF **A01**
Oklahoma Univ., Norman.
Three-Dimensional Finite-Element Analysis of Layered Composite Structures.
Technical rept.,
W. C. Chao, N. S. Putcha, and J. N. Reddy. Jul 82, 14p Rept nos. VPI-E-82-19, TR-29
Contract N00014-78-C-0647, Grant NAG3-208
In cooperation with Virginia Polytechnic Inst and State Univ. Blacksburg, Dept of Engineering Science and Mechanics.

Part 1 of the report is concerned with the large deformation bending of laminated composite shells by the 'degenerate' three-dimensional element. The present results agree well with the results available in the literature. Part 2 of the report is concerned with the full three-dimensional finite-element analysis of laminated anisotropic composite plates. The present linear analysis results compare favorably with those presented by Pagano. (Author)

AD-A117 505/8 PC **A02**/MF **A01**
Stanford Univ., CA. Div. of Applied Mechanics.
The Analysis of Elastic-Plastic Deformation and Stress at Finite Strain and Their Evaluation.
Final rept. 1 Oct 80-31 Dec 81,
E. H. Lee, and R. L. Mallett. 7 Jul 82, 10p ARO-17689.2-EG
Contract DAAG29-81-K-0002

Several aspects of elastic-plastic analysis relevant to technological applications which have been investigated on the project are discussed. References to the reports or papers dealing with these aspects are given. The topics are: (1) the generation of residual stress in metal-forming processes, in particular extrusion; (2) finite-deformation elastic-plastic theory based on the nonlinear coupled kinematics; (3) stress analysis in the presence of anisotropic hardening, in particular kinematic hardening; and (4) computer program development to improve accuracy and generality. (Author)

AD-A117 622/1 PC **A04**/MF **A01**
Pennsylvania State Univ., State College. Applied Research Lab.
Elastic/plastic Finite Element Analysis of a Single Edge-Cracked Beam Subjected to Mode I Tensile Loading.
Master's thesis,
Edward Paul Moskal. 24 May 82, 56p Rept no. ARL/PSU/TR-82-131
Contract N00024-79-C-6043

A thorough analysis of the stresses, strains and displacements surrounding the crack tip of a single edge-cracked beam subjected to Mode I tensile loading was performed by constructing various two-dimensional finite element models. Of particular interest in the analysis was: (1) determination of the Mode I stress intensity factor in the elastic models and (2) examination of the size and character of the plastic zone in the elastic-perfectly plastic models. The finite element program used in the investigation was BOPACE-3D (The Boeing Plastic Analysis Capability for Engines). In order to model the singularity effects at the crack tip, special crack tip elements were utilized immediately surrounding the crack tip. Different crack tip elements were used for the elastic models and the elastic-perfectly plastic models. Both coarse and fine-grid meshes were evaluated in the analysis. The finite element model results are compared to various other solutions. Results for the elastic models are compared to available empirical solutions while the elastic-perfectly plastic results are examined with regard to extent and character of the elastic-plastic region. (Author)

AD-A117 713/8 PC **A04**/MF **A01**
David W. Taylor Naval Ship Research and Development Center, Bethesda, MD. Computation Mathematics and Logistics Dept.
NASTRAN and FEARS Analyses of Two Problems of Plane Elasticity.
Departmental rept.,
Donald A. Gignac, and Ivo Babuska. Jul 82, 53p
Rept no. DTNSRDC/CMLD-82/17

This report investigates the plane stress capability of the FEARS (Finite Element Adaptive Refinement Solver) program which features both adaptive meshing and a posteriori error bounding. Two benchmark plane stress problems were solved by both the FEARS and NASTRAN (NASA Structural Analysis) programs for comparison. This report presents only the basic computational results. Other reports to follow shortly will motivate the experimental procedures, analyze the results, and provide the conclusion. (Author)

N82-27760/9 PC **A02**/MF **A01**
Cape Town Univ. (South Africa). Dept. of Civil Engineering.
Variable Cross-Section Space-Frame and Shell Finite Elements.
W. S. Doyle. Apr 81, 17p TR-817S
Presented to the 3D World Congr. On Finite Element Methods.

One and two dimensional quadratic isoparametric elements in which the cross-sectional dimensions can be varied within the element are discussed. The formulation of the element stiffness and mass matrices are described briefly. The importance of the locking phenomenon is examined and stress smoothing and evaluation is discussed. A number of examples are given to show the effectiveness and the characteristics of these variable depth elements for everyday problems.

N82-27762/5 PC **A03**/MF **A01**
National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
The Design of Beams on Winkler-Pasternak Foundations for Minimum Dynamic Response and Maximum Eigenfrequency.
S. Adali. Sep 81, 36p CSIR-TWISK-233

That cross sectional shape of a beam supported by a Winkler-Pasternak foundation is determined which will minimize the dynamic response of the beam or maximize its fundamental eigenfrequency. Here the dynamic response is defined either as the maximum dynamic deflection or the maximum dynamic normal stress when the beam is subject to a periodic dynamic load. To obtain the optimal designs, the methods of mathematical programming are employed, the area function being approximated by constant or linear splines on specified partitions. An iterative solution procedure is formulated that takes the form of successive steps of analysis and optimization, beginning with an initial guess. The effect of various problem parameters on the efficiency of the designs is investigated. Numerical results indicate that the existence of a shear layer, i.e., Pasternak foundation, as opposed to a Winkler foundation, decreases the efficiency of a minimum response design but increases that of a maximum eigenfrequency design.

N82-27764/1 PC **A03**/MF **A01**
Cape Town Univ. (South Africa). Dept. of Civil Engineering.
Nonpri: The Static and Dynamic Analysis of Three Dimensional Frames Using Nonprismatic Elements.
L. Resende, and W. S. Doyle. Jan 81, 30p TR-816S

A finite element streamlined for the analysis of variable cross section beam/frame members is presented and its practical application to static and free vibration problems is illustrated. The three dimensional beam element is formulated as isoparametric, straight, with variable cross section, with variable position of the internal node and accounts for linear material and linear geometric behavior only. The three moded element can account for shear as well as axial, flexual and torsional deformations making it suitable for thin and thick member analysis. The formulation allows degeneration of the space frame element to a transition element (moment transmission eliminated) and further to a pure cross element (axial effects only) making it useful for practical application.

N82-27765/8 PC **A02**/MF **A01**
Cape Town Univ. (South Africa). Dept. of Civil Engineering.
Nonpri: An Effective Non-Prismatic Three Dimensional Beam Finite Element.
L. Resende, and W. S. Doyle. May 80, 22p TR-794S

A computer procedure for the linear elastic static analysis of three dimensional skeletal structures using the NONPRI element is presented which is capable of analyzing shallow/deep as well as nonprismatic members. A simple quadratic isoparametric line element is used and the advantages derived from its use are highlighted. The modelling of structures using this element is discussed. Practical examples show the advantages of the element and results from other sources are given for comparison purposes.

N82-27766/6 PC **A03**/MF **A01**
Cape Town Univ. (South Africa). Dept. of Civil Engineering.
A Variable Cross Section 3-D Beam Finite Element for Static and Free Vibration Analyses.
L. Resende, and W. S. Doyle. Oct 80, 38p TR-806S

The development of a nonprismatic (variable cross section) 3-D beam finite element is discussed. The validity and advantages of the variable cross section formulation are investigated in the cases of static and free vibration analyses of structures consisting of members whose constitutive relationship is linear elastic. The formulation of the element is based on the quadratic isoparametric class of finite elements. The three noded element is versatile in that it can be used for thick as well as thin beam analysis. In the context of free vibration analysis, the effects of rotatory inertia and different mass matrix evaluation schemes are investigated. The solution algorithms employed are discussed. Numerical examples and results obtained from the developed computer program, NONPRI, are presented together with results from other sources for comparison purposes.

N82-27767/4 PC **A03**/MF **A01**
Cape Town Univ. (South Africa). Dept. of Civil Engineering.
A Review of Bending Finite Elements with Special Reference to the Formulation of an Isoparametric Non-Uniform 3D Beam Element.
L. Resende, and W. S. Doyle. Jan 81, 32p TR-807S

Some concepts involved in the formulation of bending finite elements are reviewed. Special reference is made to the development of an isoparametric non-uniform 3D beam finite element for linear static and dynamic analysis. Advantages and problem areas inherent in this particular formulation are investigated. Other bending finite elements are also briefly discussed. Numerical examples and results are presented in order to illustrate important characteristics of the elements discussed.

N82-27768/2 PC **A03**/MF **A01**
Cape Town Univ. (South Africa). Dept. of Civil Engineering.
Plane Stress/Strain Analysis by Boundary Integral Equation and Finite Element Methods.
G. C. Howell, and W. S. Doyle. Mar 81, 26p TR-813S

The basis of the finite element method and the boundary integral equation method is derived from the basis differential equations by using a weighted residual technique. The resulting equations form the virtual work statement and the total potential energy of the system and are used to develop the numerical F E method. The BIEM is derived from an extended weighted residual equation which produces a reciprocal statement, known as the Betti-Somigliana formula. A set of known fundamental displacement and traction solutions, which satisfy the differential equation in the domain, are used to form a numerical technique involving only the boundaries. The numerical strategies employed are described and an example highlights the salient points concerning each method.

N82-27769/0 PC **A03**/MF **A01**
Cape Town Univ. (South Africa). Dept. of Civil Engineering.
Boundary Integrals an Alternative to Finite Elements for Plane Elasticity Problems.
G. C. Howell, and W. S. Doyle. Jan 81, 28p TR-812S

The boundary integral equation method is discussed as it is applied to two dimensional elastostatic problems. The method is traced from the basic elasticity equations, through the integral formulation and into the numerical representation. Constant, linear and quadratic interpolation of the boundary values over the boundary segments are discussed. Internal stress and displacement fields are then calculated from the resulting solution. Examples are presented to show the advantages inherent in the method when it is used for design purposes.

N82-27770/8 PC **A03**/MF **A01**
Cape Town Univ. (South Africa). Dept. of Civil Engineering.
Axisymmetric Thin Shells.
A. R. Lloyd, and W. S. Doyle. Feb 81, 32p TR-811S

A finite element computer program for the static linear elastic analysis of variable thickness, branched axisymmetric thin shells uses meridionally curved rings in which the assumed displacements are described by polynomials involving generalized coordinates. Meridional and circumferential displacements are assumed to vary linearly, and radial displacements vary cubically along the length of the element. This shell is isotropic, in a condition of plane stress, and is assumed to obey Kirchhoff's theory. Strains and curvature changes are based on the strain displacement relation derived from the general theory of Novozhilov. Equilibrium equations are solved using the Cholesky factorization. General distributed and concentrated loading can be applied, as well as thermal loads. Nonaxisymmetric loads are approximated around the circumference using Fourier series for a number of harmonics. A solution is determined for each harmonic, and these are summed to give the solution for the full load conditions. Typical examples illustrate the method.

N82-27771/6 PC **A02**/MF **A01**
Cape Town Univ. (South Africa). Dept. of Civil Engineering.
A Resume of Boundary Integral Methods (In 2-Dimensional Elasticity).
G. C. Howell, and W. S. Doyle. 1982, 18p TR-804S

The boundary integral method is a general technique for the solution of differential equations. It is assumed that the equations are elliptical in form and hence the solution discussed is parallelled by other methods, including the well known finite element method and finite difference method. The discussion of boundary integral methods leads initially to two distinct but equivalent methods of attack, viz. (1) The 'indirect' method, and (2) The 'direct' method. The indirect method is less rigorous than the direct method, but nevertheless is just as effective in most cases. It is based on the idea that the potential state within a particular domain is given by an unknown distribution of sources or dipoles (variables) over the boundary. The problem is solved in terms of the sources or dipoles by enforcing the boundary conditions at collocation points on the boundary. Numerically, this procedures a system of simultaneous equations (in general, nonsymmetric) which yield the distribution of the unknown variables.

N82-27795/5 PC **A02**/MF **A01**
British Aerospace Aircraft Group, Preston (England).
Simplifying the Task of Analysing Nastran Computer Results.
E. S. Hardman, D. Caborn, P. Titcombe, and E. H. Green. Feb 82, 17p BAE-SON(P)-282

Present methods of using the NASTRAN structural analysis capability are reviewed. Factors which determine the type and scale of an analysis are discussed together with the influence which these early decisions have on the ultimate case, or otherwise, with which the results are interpreted. Output diagnostics are required to determine if a valid solution is obtained and advice is given on the checks which should be made to ensure that significant errors are not present. The range of output options is explored and the pros and cons of different media are listed along with advice on how to keep unnecessary output to a minimum. Ways in which the data preparation and output interpretation phases can be progressively automated, thereby reducing the labor intensive nature of this activity, are suggested.

N82-28059/5 PC **A07**/MF **A01**
Cape Town Univ. (South Africa). Dept. of Civil Engineering.
Proceedings of the Symposium on Design Applications of the Finite Element Method, Volume 2.
1981, 148p
Symp. Held at Cape Town, 12-14, Jan. 1981.

The static and dynamic analysis of three dimensional frames using nonprismatic elements is discussed. Bifurcation of plastic pressurized thick-walled cylinders is considered. Shipping of PTFE bearings on long bridges is discussed. Nonlinear geometric material and time dependent analysis of reinforced and prestressed slab panels are considered. Finite element analysis of dynamically loaded homogeneous viscous beams is discussed. An algorithm to solve the piecewise linear contact problem is presented.

N82-28060/3 PC **A06**/MF **A01**
Cape Town Univ. (South Africa). Dept. of Civil Engineering.
Proceedings of the Symposium on Design Applications of the Finite Element Method, Volume 3.
1981, 112p
Symp. Held at Cape Town, 12-14 Jan. 1981.

Practical applications of the finite element method (FEM) are discussed. Aspects of FEM modelling of large structures are considered. Practical views on effective computer analysis are discussed. Partial elimination techniques for structural equations are explained. FEM analysis of tall buildings is addressed. Sub structuring in finite element analysis is considered.

PB82-253840 PC **A03**/MF **A01**
Cambridge Univ. (England). Dept. of Engineering.
The Analysis of Cyclically Symmetric Structures.
Final rept.,
T. Smithers. 1980, 34p CUED/F-CAMS/TR-200-1980
Also pub. in ISSN-0309-765X.

An analytical model based on the concept of symmetric co-ordinates was developed to estimate the structural displacements of a four-fold cyclically symmetric structure. The model considered a general non-cyclically symmetric central region subjected to non-cyclically symmetric load patterns. The theory was extended to an n-fold symmetric structure. A relationship between the transformation supermatrix and the structural stiffness supermatrix was derived. This resulted in an effective adjustment of the stiffness matrix terms for a change in the structural displacement under a particular load.

PB82-253899 PC **A04**/MF **A01**
Southampton Univ. (England). Inst. of Sound and Vibration Research.
A Critical Assessment of Deterministic and Statistical Techniques for the Dynamic Identification of Structural Systems Using a Fast Swept Sinusoidal Test Signal.
Final rept.,
M. J. Lowrey. Sep 81, 62p ISVR-TR-118

Test data were obtained for a typical structural component (a 2 m steel beam) subjected to a fast swept sinusoidal excitation, and comparative frequency-domain results obtained using deterministic and statistical procedures. A quantitative comparison of resonant frequencies and damping loss factors was obtained by applying a curve-fitting technique to the complex mobility data. The problem of calibration of results in the cross-correlation method of statistical analysis was addressed. The accuracy of the separate methods was assessed by comparing, for a simulated shock loading condition, the actual time-domain response with that predicted by convolution using the respective mathematical models. Reliability was compared by making further tests in the presence of additive noise.

20L. Solid-State Physics

AD-A117 433/3 PC **A02**/MF **A01**
Army Electronics Technology and Devices Lab., Fort Monmouth, NJ.
Utilization of Quantum Distribution Functions for Ultra-Submicron Device Transport.
Conference paper,
G. J. Iafrate. 18 Jun 82, 12p
Paper from the Proceedings of the Army Sciences Conference (1982), 15-18 Jun 82.

This paper puts forth a formalism for treating ultra-submicron device transport. The formalism results in a useful and attractive methodology for describing quantum device transport in that the theory is derived from a fully quantum mechanical representation, yet implicitly contains elements of the semiclassical semiconductor transport picture. The basic three semiconductor quantum transport equations were derived using the Wigner distribution function. These transport equations were shown to contain explicit quantum corrections; these quantum corrections are non-negligible when the transit lengths of the semiconductor device are of the order of the carrier deBroglie wavelength. Since the carrier deBroglie wavelength for carriers is of the order of hundreds of angstroms in III-V device materials of interest to the Army, the quantum description of transport as described here will play a vital role in predicting the electrical behavior of present and future generation ultra-submicron devices. In future studies, theoretical efforts will be expanded to include device modeling of submicron and ultra-submicron semiconductor devices such as P-N junctions, planar doped barriers, and one- and two-dimensional superlattices; for these devices, it is clear that quantum transport will indeed be necessary to explain their semiconductor transport characteristics.

AD-A117 437/4 PC **A02**/MF **A01**
Colorado State Univ., Fort Collins.
Non-Equilibrium Hot-Carrier Diffusion Phenomena in Semiconductors: I. A Theoretical Non-Markovian Approach,
J. Zimmermann, P. Lugli, and D. K. Ferry. 1981, 8p
Rept no. CSU-TR-N-82-4
Pub. in Jnl. de Physique, v42 supplement n10 Oct 81. Abstract in French. See also AD-A113 989.

No abstract available.

AD-A117 522/3 PC **A02**/MF **A01**
Colorado State Univ., Fort Collins.
Transport in Submicron Devices.
Technical rept.,
D. K. Ferry. 1981, 10p Rept no. CSU-TR-N-82-5
Contract N00014-78-C-0124
Pub. in Jnl. de Physique, v42 pc7-253-pc7-261 Oct 81.

No abstract available.

AD-A117 583/5 Not available NTIS
Rockwell International, Thousand Oaks, CA. Science Center.
Electron Mobility in LPE Hg sub 1-x Cd sub x Te/CdTe Layers Near Zero Band-Gap Crossing,
J. Bajaj, S. H. Shin, G. Bostrup, and D. T. Cheung.
16 Dec 81, 4p ARO-17721.1-EL
Contract DAAG29-81-C-0012
Availability: Pub. in Jnl. of Vacuum Science and Technology, v21 n1 p244-246 May-Jun 82 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A117 636/1 Not available NTIS
Johns Hopkins Univ., Laurel, MD. Applied Physics Lab.
Moessbauer Investigation of Sputtered Ferromagnetic Amorphous Fe(x)B(100-x) Films,
N. A. Blum, K. Moorjani, T. O. Poehler, and F. G. Satkiewicz. 1982, 4p ARO-15344.4-PH
Contract ARO-13-81
Availability: Pub. in Jnl. of Applied Physics v53 n3 p2074-2076 1982 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A117 714/6 PC **A03**/MF **A01**
Florida State Univ., Tallahassee. Dept. of Statistics.
Central Limit Theorems in the Area of Large Deviations for Some Dependent Random Variables.
Technical rept.,
Narasinga Rao Chaganty, and J. Sethuraman. Jul 82, 27p FSU-STATISTICS-M634, TR-D-54-ARO, ARO-16713.20-MA
Contract DAAG29-79-C-0158

In this paper we obtain central limit theorems for some dependent random variables which are used to describe the distribution of magnetic spins present in a ferromagnet crystal. A ferromagnet crystal consists of a large number of sites. At site i there is some amount of magnetic spin present. The magnetic spin present at any site interacts with the magnetic spins at its neighboring sites and hence gives rise to some dependency among the magnetic spin present.

AD-A117 729/4 PC **A02**/MF **A01**
California Univ., Los Angeles. Dept. of Physics.
Characterization of Infrared Optical Properties of Layered Semiconductors.
Annual scientific rept. 1 Apr 81-31 Mar 82,
Rubin Braunstein. 20 Mar 82, 17p AFOSR-TR-82-0581
Grant AFOSR-78-3665

The techniques of infrared wavelength modulation and the techniques of photo-induced-transients-spectroscopy were used to study the electronic structure and lattice dynamics of semiconductors. These studies have included: (1) the assessment of homogeneity of doping and strain in layer semiconductors; (2) the electronic structure of deep levels by wavelength modulation; and (3) study of deep levels by photoinduced transients spectroscopy. The present work was primarily directed toward GaAs and Si. (Author)

AD-A117 777/3 Not available NTIS
Hughes Research Labs., Malibu, CA.
Theoretical Calculation of Hg-Cd-Te Liquidus-Solidus Phase Diagram,
Ryoichi Kikuchi. 28 Oct 81, 5p ARO-17090.2-PH
Contract DAAG29-80-C-0116
Availability: Pub. in Jnl. of Vacuum Science and Technology, v21 n1 p129-132 May/Jun 82 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A117 820/1 Not available NTIS
Hughes Research Labs., Malibu, CA.
Liquidus Calculation of II-VI Compound Semiconductors,
Ryoichi Kikuchi. 6 Nov 81, 11p ARO-17090.1-PH
Contract DAAG29-80-C-0116
Availability: Pub. in Calphad, v6 n1 p1-10 1982 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A117 822/7 PC **A02**/MF **A01**
Stanford Univ., CA. Edward L. Ginzton Lab. of Physics.
Surface Ripples on Silicon and Gallium Arsenide under Picosecond Laser Illumination.
Interim rept.,
P. M. Fauchet, and A. E. Siegman. 5 Nov 81, 5p GL-3391, AFOSR-TR-82-0612
Grant AFOSR-80-0145
Pub. in Applied Physics Letters, v40 n9 p824-826, 1 May 82.

No abstract available.

AD-A117 871/4 PC **A05**/MF **A01**
Florida Univ., Gainesville. Dept. of Electrical Engineering.
Studies of Growth-In Defects and Transport Properties Versus Growth Parameters in III-V Compound Semiconductors.
Annual technical rept. 11 Jun 81-10 Jun 82,
Sheng S. Li. 10 Jun 82, 92p AFOSR-TR-82-0570
Grant AFOSR-81-0187

The objectives of this research project are: (1) to investigate the grown-in deep level defects vs. growth parameters (e.g., growth temperature, growth rate, Ga/As ratio, and substrate orientations) in GaAs epilayers grown by liquid phase epitaxial (LPE) and vapor phase epitaxial (VPE) techniques, (2) to study the transport properties vs. growth parameters in the LPE and VPE grown GaAs, and (3) to study the effects of combined thermal and injection annealing on the grown-in defects in the VPE GaAs epilayers.

AD-A117 922/5 PC **A13**/MF **A01**
Carnegie-Mellon Univ., Pittsburgh, PA.
A Program of Research on Microfabrication Techniques for VLSI Magnetic Devices.
Annual interim progress rept. no. 1, 30 Sep 80-29 Sep 81,
M. H. Kryder, C. L. Bauer, J. A. Rayne, and A. Guzman. 1 Oct 81, 277p AFOSR-TR-82-0610
Grant AFOSR-80-0284

Means of fabricating, selectively modifying, and characterizing single crystal epitaxial garnet and amorphous magnetic thin films films are being investigated with the intention of developing new materials and processes for magnetic devices including bubble, recording, magneto-optic, and microwave devices. Techniques for the routine deposition of these materials have been established and several novel characterization techniques developed. Transmission electron microscopy has been used to investigate structural effects of ion implantation on garnet materials and selected area transmission electron diffraction has been used to study strain profiles at boundaries between implanted and unimplanted garnet material. A magneto-optic photometer system which permits characterization of thin (approx 1000A) layers of magnetic material with resolution on the order of a micrometer has been developed and used to magnetically characterize ion implanted layers of garnet. Optical spectra of ion implanted garnets are being studied to gain information on the stoichiometric and crystal field deviations produced by ion implantation in garnets. Amorphous magnetic materials are being researched in an attempt to replace the more expensive single crystal magnetic garnets. Furthermore, both contiguous-disk and current-access magnetic bubble devices have been fabricated and a novel current-access ion-implanted device demonstrated to require low power dissipation. (Author)

AD-A117 945/6 PC **A05**/MF **A01**
Oklahoma Univ., Norman. School of Aerospace, Mechanical and Nuclear Engineering.
Analytical and Experimental Investigations of Bimodular Composite Beams.
Technical rept.,
Charles W. Bert, Clarence A. Rebello, and C. J. Rebello. Jul 82, 84p Rept nos. OU-AMNE-82-2, TR-26
Contract N00014-78-C-0647

This study deals with both analytical and experimental investigations of sandwich beams with cores of polyurethane foam and facings of unidirectional cord-rubber, which is bimodular (i.e., having drastically different behavoir in compression as compared to tension). This work is believed to be the first devoted to vibration of bimodular mateials in a sandwich configuration. Two different analyses are presented: one is a sandwich version of the well-known Timoshenko beam theory, which results in a fourth-order flexural differential equation. The other is a refinement of the DiTaranto-Mead-Markus sixth-order theory with the addition of rotatory inertia. Theoretical and experimental results are presented for the frequencies of the first three modes of vibration for a pin-ended beam without axial restraint.

DE82007761 MF **A01**
Sandia National Labs., Albuquerque, NM.
Bandstructure of Impurity Sheet Doped Superlattice Alloys.
H. P. Hjalmarson. 1982, 16p SAND-82-0339C, CONF-820124-2
Contract AC04-76DP00789
Annual conference on physics and chemistry of semiconductor interfaces, Pacific Grove, CA, USA, 27 Jan 1982, Portions of this report are illegible.
Available in microfiche only.

The bandstructure and density of states for large superlattices of (100) Ga-site Ge and As-site N impurity-sheets in GaAs have been calculated by a semi-empirical tight-binding technique. Both of these two-dimensional conduction-band derived bands have a J-point indirect minimum which is deep in energy, approx.0.5 eV, relative to the bulk conduction bandedge. It is shown that, in general, a planar defect localizes or binds one or more states. It is suggested that the large binding energies of these sheets will confine electric-field-accelerated carriers and thus such superlattices will be highly conductive parallel to the impurity sheets. (ERA citation 07:047452)

DE82902596 PC **A03**/MF **A01**
Kozponti Fizikai Kutato Intezet, Budapest (Hungary).
Ising Models Without Phase Transitions.
A. Sueto. Nov 80, 44p KFKI-1980-117
U.S. Sales Only.

Two families of Ising models, one on the Kagome lattice and the other on the square lattice, are studied. The interaction is chosen to be a particular mixture of ferro- and antiferromagnetic bonds. It is shown that the free energy is analytic at every positive temperature. For the Kagome lattice models, the correlations in the totally symmetric equilibrium state are analytic and exponentially clustering at every temperature, including T=0. (ERA citation 07:045218)

PATENT-4 333 344 Not available NTIS
Department of the Army, Washington, DC.
System and Method for Testing the Reaction of Rare Earth Ions.
Patent,
Clyde A. Morrison, and Joseph P. Sattler. Filed 28 Oct 80, patented 8 Jun 82, 5p AD-D009 536/4, PAT-APPL-6-200 832
Supersedes PAT-APPL-6-200 832, AD-D008 214.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A crystalline bar is doped with a rare earth. The bar is transparent to radiation, such as from a laser, at a light wavelength which excites the rare earth ions in the bar and the light is modulated at the frequency at which the bar mechanically resonates. The excited ion decay radiatively by light or non-radiatively by phonons. As the phonons decay, they excite the bar to resonate mechanically. The mechanical resonance may be coupled by a piezoelectric material and measured to give information respecting the phonon activity of the excited rare earth ions. (Author)

PB82-252529 PC **A03**/MF **A01**
Cambridge Univ. (England). Dept. of Engineering.
On Creep Enhanced by a Liquid Phase.
Final rept.,
G. M. Pharr, and M. F. Ashby. May 80, 27p CUED/C/MATS/TR-69
Contract NSF-SPI79-14885
Also pub. in ISSN-0309-6505.

Uniaxial and triaxial compression creep tests were performed in porous KCl in the dry state and with the pores filled with either saturated aqueous KCl solution or an organic liquid (e.g. kerosene). Enhanced creep rate with an estimated activation energy of 19kJ/mole was observed in the aqueous solution only. The stress dependence of creep-rate was linear over a large range of the deviatoric component of the stress. Existing models for liquid-enhanced creep were reviewed, outlining the inadequacies in terms of experimental results. An alternative mechanism, which allowed steady deformation of the powder aggregate, incorporated the solubility of solids in liquids with plasticity or power-law creep.

PB82-252537 PC **A05**/MF **A01**
Cambridge Univ. (England). Dept. of Engineering.
On Creep Fracture by Void Growth.
Final rept.,
A. C. F. Cocks, and M. F. Ashby. Jul 80, 100p CUED/C/MATS/TR-67
Also pub. as ISSN-0309-6505.

The growth of void-like creep damage is analysed. Voids can grow by mechanisms controlled by grain-boundary diffusion, by surface diffusion, by power-law creep and by any combination of two of these. Approximate analytical equations for the growth rate by each mechanism, under multiaxial stress states, are developed and related to a number of published analyses. The growth equations are integrated to give times and strains to fracture under constant (multiaxial) stress, constant load and two simple load histories. Both quasi-iniform and non-uniform distributions of voids are considered. The formulation can be related to the continuum damage method of Kachanov and suggests modifications to this method. It leads to a new prescription for extrapolating creep data. A unified

picture of void growth appears possible, embracing most aspects of previously published models.

PB82-254178 PC **A06**/MF **A01**
Cambridge Univ. (England). Dept. of Engineering.
Mechanisms of Deformation and Fracture.
Final rept.,
M. F. Ashby. Jan 82, 102p CUED/C/MATS/TR-92
Also pub. in ISSN-0309-6505.

Complex phenomena such as deformation or fracture, involving several competing mechanisms, were presented in the form of diagrams or maps which showed the range of variables i.e. stress and temperature, over which each separate competing mechanism was dominant. The maps were constructed empirically in the case of fracture or, by using constitutive laws, in the case of deformation. It was found that groups of materials with the same crystal structure, bonding, purity and microstructure, had closely similar maps. Maps were constructed for Ni, Nimonic-80 alloy, W. Mg, NaCl, MgO, Al2O3 and ice (important for offshore structural design). It was demonstrated that the maps permit the quick identification of the dominant mechanism for a given engineering application, that they help in alloy selection and design and that they allow a body of detailed data to be presented simply in a readily accessible form.

20M. Thermodynamics

DE82701436 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Service des Techniques Instrumentales.
Helium II Experimental Facilities at Saclay.
J. C. Lottin. Aug 81, 8p CEA-CONF-5898, CONF-810835-42
1981 cryogenic engineering conference, San Diego, CA, USA, 10 Aug 1981.
U.S. Sales Only.

In this paper we describe two laboratory test facilities constructed and operated at Saclay for general studies on thermal properties of He II at variable temperatures and pressures related to the cooling of superconducting magnets. Two other He II facilities also in operation at Saclay and built in a joint collaboration of three CEA Laboratories (Fontenay-aux-Roses, Grenoble, and Saclay) for the qualification tests of a new tokomak Tore Supra, under construction in France, have already been reported in detail. (Atomindex citation 13:660780)

DE82701437 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Service des Techniques Instrumentales.
Thermal Instabilities in an Helium II Channel.
D. Gentile, and M. X. Francois. Aug 81, 7p CEA-CONF-5899, CONF-810835-43
1981 cryogenic engineering conference, San Diego, CA, USA, 10 Aug 1981.
U.S. Sales Only.

Cooling of superconductors by helium II is proving to be a very useful technique which has been studied for a few years by several groups. The advantage of He II is the enhanced thermal stability of the conductor due to the superfluid properties and consequently the greater heat fluxes which can be transfered from the solid to the coolant. So far, most studies of the stationary and transient thermal properties of cooling channels have been performed in experimental configurations where the heat flux is uniform. In a previous paper, the different stationary heat flow regimes were described for a channel filled with saturated helium II and with a non-uniform heat flux due to the experimental configuration. It was shown that above a certain value of the heat flux Q sub 0 the value of Q greatly increases with a very little increase in average temperature, and in this regime the temperature oscillates by a few mK. It appears that an additional heat transfer process is present in parallel with the classical Gorter-Mellink (GM) process. This paper is a more detailed experimental study of these temperature fluctuations and an interpretation is given in terms of local nucleation in the fluid. (Atomindex citation 13:660781)

20N. Wave Propagation

AD-A117 419/2 PC **A04**/MF **A01**
Aerospace Corp., El Segundo, CA. Space Sciences Lab.
High-Power Transportable VLF Transmitter Facility.
Technical rept.,
Mitchell H. Dazey, and Harry C. Koons. 25 May 82, 63p TR-0082(2940-06)-2, SD-TR-82-31
Contract F04701-81-C-0082

A 100-kW, transportable, very-low-frequency (TVLF) transmitter facility has been used for magnetospheric wave-injection experiments from sites in Alaska, New Zealand and Norway. A unique feature of the TVLF facility is the antenna which is a conducting cable lofted to an altitude of 1000 m by a 1000 cu m3 helium balloon. The antenna is driven at its base as a monopole above a ground plane. The antenna cable also serves as the balloon tether. The lowest operating frequency in this configuration is 6.6 kHz at which the radiated power is 100 W. At the highest operating frequency used in the experiments, 21 kHz, the radiated power is 10 kW. In Norway power lines were used as antennas. The minimum operating frequency was then 1 kHz and the radiated power is estimated to be about 0.5 W. In this report we describe the components and performance of the TVLF as used for these magnetospheric experiments. (Author)

AD-A117 434/1 PC **A02**/MF **A01**
Army Communications-Electronics Command, Fort Monmouth, NJ.
Effects of Vegetation and Battlefield Obscurants on Point-to-Point Transmission in the Lower Millimeter Wave Region (30-60GHz).
Conference paper,
Felix K. Schwering, Robert A. Johnson, Nikolaus Rokkos, Gerald M. Whitman, and Edmond J. Violette. 18 Jun 82, 14p
Paper from the Proceedings of the Army Sciences Conference (1982), 15-18 Jun 82.

This paper reports on recent studies on mm-wave transmission through vegetation and through battlefield obscurants such as smoke, dust and artillery shell detonation clouds. Experimental investigations supported by theoretical studies confirm that mm-wave links are capable of providing highly reliable communication in the battlefield environment. Specifically: (a) Millimeter wave transmission through a line of trees or placement of radios at moderate depths into woods (for camouflage purposes) will be possible, although at the price of a reduced transmission distance. The range reduction will depend on vegetation depth and density; (b) Millimeter wave attenuation by smoke and dust is minimal and not likely to noticeably affect link availability; and (c) Artillery shell detonations may temporarily interrupt signal transmission but only under unfavorable circumstances, i.e., if the explosion occurs below ground and the detonation cloud intercepts the line-of-sight. Even under these conditions, outage times will be less than 1 second. These results apply to voice, video as well as data transmission.

AD-A117 637/9 Not available NTIS
Rochester Univ., NY. Dept. of Physics and Astronomy.
Propagation Parameters of Gaussian Schell-Model Beams,
Ari T. Friberg, and Ronald J. Sudol. 28 Jan 82, 7p ARO-16814.17-PH
Contract DAAG29-80-C-0020
Availability: Pub. in Jnl. of Optics Communications, v41 n6 p383-387 1982 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A117 723/7 PC **A04**/MF **A01**
La Jolla Inst., CA.
Path Integral Formation of Wave Propagation in the Ionosphere. IV.
Final rept.,
V. Seshadri, and Bruce J. West. 1982, 63p LJI-R-82-195, AFOSR-TR-82-0578
Grant AFOSR-80-0187

The validity of the application of weak scatter theory to ionospheric scattering data has been examined. It is concluded that the weak scatter theory is not universally applicable. Born and Rytov weak scatter calculations are compared and the Rytov calculations is found superior. The Rytov calculations appear to explain the enhancement in the scintillation index (the ratio on the intensity variance to variance of phase) in the equatorial vis a vis the polar stations. This research effort will be completed under Contract Number 49620-82-C-0058. (Author)

AD-A117 851/6 PC **A06**/MF **A01**
Naval Ocean Systems Center, San Diego, CA.
Development of a Minicomputer Atmospheric Noise Model.
Technical rept. Jan-Sep 81,
D. B. Sailors, and R. P. Brown. 1 May 82, 107p Rept no. NOSC/TR-778

A practical but simplified atmospheric noise model for use in estimating system signal-to-noise ratios in micro-mini-computer based HF propagation prediction systems is presented. Numerical mapping techniques were used to represent worldwide atmospheric noise at 1 MHz in 24 numerical maps: one for each of six 4-hour time blocks (in universal time) and each of four 3-month periods. This representation results in a minimum reduction by one-fifth in the number of coefficients necessary in computer memory over that of an earlier model in which the map represented an entire twenty-four hour day. (Author)

AD-A117 852/4 PC **A06**/MF **A01**
Naval Ocean Systems Center, San Diego, CA.
EMI Evaluation of SESEF.
Final rept. Dec 81-Jan 82,
S. T. Li, J. C. Logan, and D. W. S. Tam. Feb 82, 113p Rept no. NOSC/TR-762

This report describes an EMI evaluation of the effects of off-shore exploratory drilling operations on the SESEF facility at Long Beach Naval Shipyard. This study uses mathematical model simulation techniques to determine interference effects due to electromagnetic scattering (diffraction and multipath reflections). Interference due to radio frequency transmissions and electromagnetic noise is also considered. (Author)

AD-A117 898/7 PC **A06**/MF **A01**
Naval Ocean Systems Center, San Diego, CA.
Decision-Feedback Equalizer Simulation (DFES) - Description of Variables.
Technical document Oct 80-Mar 81,
K. L. Payne. Oct 81, 119p Rept no. NOSC/TD-469

This document lists and describes the usage of the variables in the Decision-Feedback Equalizer Simulation (DFES) program which was written for the Naval Ocean Systems Center by Signatron, Inc. The DFES program can transmit QPSK or BPSK through an hf channel. The channel can have fading, doppler and multipath. The transmission can be received and demodulated by a Desicion-Feedback Equalizer with one of four weight update algorithms: Kalman, LMS, fixed, and Rake. (Author)

PB82-873282 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Ionospheric and Geomagnetic Radiowave Interference. 1975-August, 1982 (Citations from the International Information Service for the Physics and Engineering Communities Data Base).
Rept. for 1975-Aug 82.
Aug 82, 179p

This bibliography contains citations concerning ionospheric and geomagnetic radiowave interference. Ionospheric radiowave propagation and scattering, atmospheric radio noise, radiofrequency interference, and ionospheric electron density profile are discussed. Radio signal attenuation and interference, ionospheric propagation mechanism, magnetospheric phenomena, seasonal and phase variations, and multipath effects are also presented. (Contains 158 citations fully indexed and including a title list.)

PROPULSION AND FUELS

21B. Combustion and Ignition

AD-A117 749/2 PC **A06**/MF **A01**
Pratt and Whitney Aircraft Group, West Palm Beach, FL. Government Products Div.
Augmentor Stability Management Program User's Manual.
Final rept. 1 Sep 79-1 Sep 81,
R. C. Ernst. Nov 81, 114p PWA-FR-15323, AFWAL-TR-81-2113
Contract F33615-79-C-2059

This report describes the computer code and the models developed to form the computer code used to analyze low frequency augmentor instability (rumble). Rumble occurs mainly at high fuel-air ratios and at flight Mach numbers and altitudes were low duct inlet air temperatures and pressures exist. Complete description of the models and the program responsible for their development is contained in AFWAL-TR-81-2113. (Author)

DE82009310 MF **A01**
Kansas State Univ., Manhattan.
Diffusion Flame Studies of the Chemical and Physical Mechanisms of Soot Formation from Aromatic and Substituted Aromatic Fuels. Progress Report, February 15, 1981-February 15, 1982.
T. W. Lester, J. F. Merklin, and C. M. Sorensen. Mar 82, 22p DOE/ER/10677-2
Contract AC02-80ER10677
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

The development of photon correlation spectroscopy (PCS) as a soot particle size measurement in flames has been pursued. Using both slot diffusion flames doped with benzene and a wick diffusion flame burning kerosene, soot size distributions have been determined as a function of height above the base of the flame. Of particular interest has been the correct relationship between the particle diffusion coefficient and the particle diameter. Effort has also been expanded in extraction of the higher moments of the size distribution from the scattered light spectra. Papers covering this year's activities have been published in Applied Optics and accepted for presentation at the 1982 Spring Meeting of the Combustion Institute/Central States Section and at the Joint AIAA/ASME Thermophysics Conference. (ERA citation 07:044316)

DE82009323 PC **A15**/MF **A01**
Arizona Univ., Tucson. Dept. of Electrical Engineering.
Advanced Staged Combustion Configurations for Pulverized Coal. Topical Report No. 1. Fuel Nitrogen Conversion During Fuel-Rich Combustion of Pulverized Coal and Char.
J. W. Glass, and J. O. L. Wendt. Dec 81, 330p DOE/ET/15184-1152
Contract AC21-79ET15184
Portions of document are illegible.

The relative importance of homogeneous and heterogeneous mechanisms governing the destruction of chemically bound nitrogen during the fuel rich combustion of a Utah bituminous pulverized coal and its char was determined. Pulverized fuels were burned in a self sustaining but well characterized mode in a 15 cm ID downflow combustor. Measurements included time resolved profiles of major species, minor nitrogenous species and char nitrogen concentrations as well as (thermocouple) gas and (optical) particle temperatures. Data from fuel-rich char combustion studies (SR=0.8,0.4) show that concentrations of HCN and NH sub 3 in the post flame gases were small compared to the concentration of NO. NO destruction was found to be controlled by an heterogeneous mechanism involving the char carbon surface and this mechanism, which is deactivated by oxygen, was modeled, yielding rates consistent with those in the literature. The fuel rich coal combustion studies yielded profiles of high concentrations of HC, NO and NH sub 3 . The decay of NO in the post flame was not consistent with the heterogeneous rate determined from the char data. Rather, the data show that reactions in the gas phase dominate and the global homogeneous kinetics equations given describe (with one exception) the post-flame nitrogenous species concentrations. This is consistent with the gas phase kinetics of Fenmore.

DE82009715 MF **A01**
Washington State Univ., Pullman. Dept. of Mechanical Engineering.
Evaluation of a Rectangular Opposed-Jet Burner for Pulverized-Coal Diffusion-Flame Studies.
A. M. Zghoul, R. N. Comstock, and W. L. Grosshandler. Apr 82, 29p CONF-820403-3
Contract FG22-80PC30216
Spring meeting of the Western States Section of the Combustion Institute, Salt Lake City, UT, USA, 12 Apr 1982, Portions of document are illegible.
Available in microfiche only.

An experimental facility which consisted of an opposed-flow burner, a fluidized-bed particle feeder, and analyzers for particle velocity and gas composition determination, was developed for performing pulverized-coal diffusion-flame studies. The goals of these studies were to determine the extent to which the flame is 2-dimensional under actual experimental condition and to assess whether or not the rectangular opposed flow diffusion-flame (OFDF) may be a useful experimental tool for studying the combustion of pulverized coal. The design and operation of the test facilities are described. The test results showed that: the rectangular OFDF burner provides a long pathlength over which the temperature and composition remain constant, thus making it ideal for line-of-sight optical measurements; the temperature and composition of stable species varies almost exclusively with the distance perpendicular to the flame front, and the structure is similar to that of an axisymmetric OFDF; the flame is sensitive to disturbances introduced by temperature and gas sampling probes; steady particle flow in a low velocity OFDF is difficult to attain; fluctuations about a steady mean are enhanced by particles which are distributed in size; and to properly characterize the burning of pulverized coal in an OFDF configuration, it will be necessary to measure simultaneously both particle size and velocity in situ under hot flow conditions. (ERA citation 07:047735)

DE82009958 PC **A02**/MF **A01**
Institute of Gas Technology, Chicago, IL.
Combustion Characteristics of Fine-Ground Coal. Project 61052 Quarterly Technical Report, June 1-August 31, 1981.
Mar 82, 23p DOE/PC/40269-6
Contract AC22-81PC40269

This program consists of a research study to investigate the effect of coal particle size on the flame characteristics of pulverized coal. The purpose is to determine if fine grinding will allow replacement of oil by coal in some industrial applications. The Plant Engineering Development Department of General Motors Corporation (GM) and the Research and Development Staff of York-Shipley, Inc. (Y-S), a major boiler manufacturer, are assisting IGT in this effort. These companies have offered to donate time to the program as industrial consultants. Pulverized coal will be fired at about 2 million Btu/h (approximately 160 lb/h) in a special experimental furnace designed to collect data on the combustion and heat-transfer characteristics of flames. Combustion trials with No. 6 oil are also planned to allow for direct correlation with the coal combustion data. Some of the information to be obtained from this study will be a determination of how the flame heat release density, mass burning rate, flame temperatures, and heat-transfer characteristics change with fuel particle size (fineness of coal grinding). It will also be possible to directly compare these parameters from the various coal flames with comparable oil flames to determine the feasibility of substituting fine-ground pulverized coal flames for heavy-oil flames. Data will also be collected to allow for the correlation of the flue-gas pollutant emissions with the fuel characteristics. Progress included purchasing the major equipment for the coal milling system, coal selection, and preparation of the combustion facility. (ERA citation 07:042226)

DE82010783 PC **A05**/MF **A01**
Battelle Columbus Labs., OH.
Program on the Combustion Chemistry of Low- and Intermediate-Btu Gas Mixtures.
30 Nov 81, 87p DOE/ET/10653-5
Contract AC22-76ET10653
Portions of document are illegible.

Low and intermediate Btu (LBTU and IBTU) gas mixtures are essentially mixtures of CO, H sub 2 and CH sub 4 diluted with nitrogen and CO sub 2 . Although the combustion properties of these three fuels have been extensively investigated and their individual combustion kinetics are reasonably well established, prediction techniques for applying these gas mixtures remain for the most part empirical. This program has aimed to bring together and apply some of the fundamental combustion parameters to the CO-H sub 2 -CH sub 4 flame system with the hope of reducing some of this empiricism. Four topical reports have resulted from this program. This final report summarizes these reports and other activities undertaken in this program. This program was initiated June 22, 1976 under ERDA Contract No. E(49-18)-2406 and was later continued under DOE/PETC and DOE Contract No. DE-AC22-76ET10653. (ERA citation 07:042219)

DE82012601 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Coyote Series for 40-M exp 3 Liquefied Natural Gas (LNG) Dispersion, RPT, and Vapor Burn Tests.
R. P. Koopman. Feb 82, 11p UCID-19211-Rev.1
Contract W-7405-ENG-48

Last year the emphasis of the 40-m exp 3 LNG spill experiments was on gas dispersion. This year the investigation was extended into the rapid phase transition (RPT) explosions, and combustion and dispersion measurements were made during vapor cloud fires. A total of 13 RPT spills in 5 tests were conducted from July to November, 1981. A summary of these tests is presented in a table. RPT testing was also done concurrently with the vapor fires. The goal of the RPT tests is to understand the physics behind RPT explosions so that their severity in an accident situation can be predicted. The focus of this year's studies was on vapor burn tests. These experiments involved a series of 5 spills of up to about 40-m exp 3 under a restricted range of atmospheric conditions with ignition near the upwind of the cloud. One test involved nearly pure methane. The experiments will provide information on the combustion characteristics of a well-mixed gas cloud in the open atmosphere. (ERA citation 07:042343)

DE82012931 PC **A02**/MF **A01**
Institute of Gas Technology, Chicago, IL.
Combustion Characteristics of Fine-Ground Coal. Project 61052 Quarterly Technical Report, December 1, 1981-February 28, 1982.
Apr 82, 20p DOE/PC/40269-13
Contract AC22-81PC40269

This program consists of a research study to investigate the effect of coal particle size on the flame characteristics of pulverized coal. The purpose is to determine if fine grinding will allow replacement of oil by coal in some industrial applications. The Plant Engineering Development Department of General Motors Corporation (GM) and the Research and Development Staff of York-Shipley, Inc. (Y-S), a major boiler manufacturer, are assisting IGT in this effort. These companies have offered to donate time to the program as industrial consultants. Pulverized coal will be fired at about 2 million Btu/hr (appoximately 160 lb/hr) in a special experimental furnace designed to collect data on the combustion and heat-transfer characteristics of flames. Combustion trials with No. 6 oil are also planned to allow for direct correlation with the coal combustion data. Some of the information to be obtained from this study will be a determination of how the flame heat release density, mass burning rate, flame temperatures, and heat-transfer characteristics change with fuel particle size (fineness of coal grinding). In addition, slagging behavior of the ash will be studied using a boiler's convective pass model and a special slagging probe. It will also be possible to directly compare these parameters from the various coal flames with comparable oil flames to determine the feasibility of substituting fine-ground pulverized coal flames for heavy-oil flames. Data will also be collected to allow for the correlation of the flue-gas pollutant emissions with the fuel characteristics. Progress in this quarter included delivery and installation of all major equipment planned for the coal milling and feeding system and the installation of the system control panel. Wiring and piping to complete the system continues. (ERA citation 07:042227)

DE82902262 PC **A06**/MF **A01**
Kaiserslautern Univ. (Germany, F.R.). Fachbereich Maschinenwesen.
Reaction Kinetics Investigations on the Combustion of Hydrogen and Methanol and Their Application to the Otto Engine.
F. Schaefer. 1 Feb 80, 121p NP-2902262
In German.Thesis. Portions of document are illegible.
U.S. Sales Only.

The present work broadens the knowledge on the mechanisms of hydrogen combustion in general and in connection with hydrocarbons, in particular methanol. The utilization of the synthetically manufacturable fuels methanol and hydrogen are tested by means of practical investigations at the engine test stand. Furthermore, using methanol-hydrogen-air kinetics, it is attempted to make statements on those procedures which cannot be determined by measurements during the engine combustion. The third main topic is the consideration of a hydrogen-air flame to enable one to gain information on basic mechanisms such as diffusion, heat conduction and chemical reactions. (ERA citation 07:044112)

DE82902359 MF **A01**
Technische Hochschule, Aachen (Germany, F.R.). Fakultaet fuer Maschinenwesen.
Calculation of Turbulent Combustion Phenomena in Flames and Combustion Chambers.
W. Kollmann. 13 Feb 79, 134p NP-2902359
In German.Thesis.
U.S. Sales Only. Available in microfiche only.

A large part of the present paper deals with the discussion of closing assumptions and their application to the calculation of turbulent diffusion flames. Separately the ways for a detailed calculation of combustion chambers, based on mathematical models for flames, are discussed. (ERA citation 07:044318)

DE82902361 MF **A01**
Technische Hochschule, Aachen (Germany, F.R.). Fakultaet fuer Maschinenwesen.
Measurement and Calculation of a Premixed Turbulent Methane/Air flame.
H. T. Sommer. 6 Jul 79, 89p NP-2902361
In German.Thesis.
U.S. Sales Only. Available in microfiche only.

A trial is to be made of investigating a special premixed turbulent methane/air flame by means of experimental methods and interpreting the results of measurement with the aid of a model calculation resp. of checking the theory by means of the experiment. For this investigation a laboratory burner has been developed by means of which a flame with a parabolic flow shape was produced for high Reynolds numbers of the emitted methane/air mixture. The use of higher kinetic reaction models in the calculation permits to obtain information about the degradation of methane in the reaction zone and the influence of radicals on the combustion. In a final valuation and discussion of the results the differences between measurement and calculation are explained and the possible sources of errors are investigated. (orig./GL. (ERA citation 07:042695)

PB82-246737
(Order as PB82-246703, PC **A02**/MF **A01**)
National Bureau of Standards, Washington, DC. National Engineering Lab.
Buoyant Convection Computed in a Vorticity, Stream-Function Formulation,
Ronald G. Rehm, Howard R. Baum, and P. Darcy Barnett. 2 Sep 81, 21p
Included in Jnl. of Research of the National Bureau of Standards, v87 n2 p165-185 Mar-Apr 82.

Model equations describing large scale buoyant convection in an enclosure are formulated with the vorticity and stream function as dependent variables. The mathematical model, based on earlier work of the authors, is unique in two respects. First, it neglects viscous and thermal conductivity effects. Second the fluid is taken to be thermally expandable: large density variations are allowed while acoustic waves are filtered out. A volumetric heat source of specified spatial and temporal variation drives the flow in a two-dimensional rectangular enclosure. An algorithm for solution of the equations in this vorticity, stream-function formulation is presented. Results of computations using this algorithm are presented. Comparison of these results with those obtained earlier by the authors using a finite difference code to integrate the primitive equations show excellent agreement. A method for periodically smoothing the computational results during a calculation, using Lanczos smoothing, is also presented. Computations with smoothing at different time intervals are presented and discussed.

PB82-262551 PC **A03**/MF **A01**
Institute of Gas Technology, Chicago, IL.
Fundamentals of Fluidization of Sticky Particles.
Annual rept. 1 Dec 80-30 Nov 81,
Cheng-Sung Huang, Hamid Arastoopour, and Sandford A. Weil. Aug 82, 29p GRI-81/0068
Contract GRI-5014-363-0241
See also PB81-202046.

It was found with high-density polyethylene particles as bed material that the amount of agglomerates generated increases with increasing bed temperature and particle residence time. In our system, the net thermal energy transferred from hot gas to the bed agglomerates generated and the amount of increase with increasing gas velocity. However, if the temperature increases too much, sintering occurs resulting in defluidization. At temperatures near the melting temperature of bed material, the surface of the particles melts and liquid bridges form between particles when they come into contact with one another. Higher temperatures lead to lower viscosity liquid on particle surfaces. As a result, stronger liquid bridges could develop in shorter periods. Breakage of particles during sieving was noted, and it appears necessary to modify the particle-size analysis.

21C. Electric Propulsion

AD-A117 797/1 PC **A02**/MF **A01**
TRW Defense and Space Systems Group, Redondo Beach, CA.
Pulsed Inductive Thruster Development (Advanced Electric Propulsion Technology - High Thrust). Volume 2. Supplement.
Final rept. Nov 80-Jun 82,
C. L. Dailey, and R. H. Lovberg. Jun 82, 16p AFRPL-TR-80-67-VOL-2
Contract F04611-79-C-0058

This report describes the results of an experimental investigation of the operation and efficiency of a large impulsive plasma thruster. The thruster uses a one-meter diameter flat spiral coil through which current is pulsed from a 4000 Joule capacitor bank using a spark gap switch. The plasma is driven through inductive coupling rather than with electrodes so as to avoid erosion and energy loss mechanisms that might be undesirable for spacecraft uses. The object of this work was to verify the results of the final report, (AFRPL-TR-80-67, to which this is a supplement), and establish more data on thruster efficiency as a function of specific impulse. The original final report indicated the thruster's efficiency was 45% at 1570 sec Isp. This supplement confirms those figures and reports additional performance figure of 50% at 1590 sec Isp, 62% at 1960 Isp, and 67% at 2250 sec Isp. (Author)

21D. Fuels

AD-A117 408/5 PC **A08**/MF **A01**
Southwest Research Inst., San Antonio, TX. Army Fuels and Lubricants Research Lab.
Research on Fire-Resistant Diesel Fuel.
Interim rept. 1 Oct 79-31 Dec 81,
W. D. Weatherford, Jr., G. E. Fodor, M. D. Kanakia, D. W. Naegeli, and B. R. Wright. Dec 81, 154p Rept no. AFLRL-145
Contracts DAAK70-80-C-0001, DAAK70-82-C-0001

When development of aqueous fire-resistant diesel fuel (FRF) was previously reported, it was shown that clear-to-hazy water-in-fuel, diesel fuel micro-emulsions could be prepared and that they exhibit reduced mist flammability and self-extinguishing pool fires at temperatures above the base fuel flash point. It was also demonstrated that unmodified diesel engines start, idle, and run without difficulty on such fuels. Research has been continued to establish compositional requirements for base fuels, surfactants, and water used in FRF formulations. DF-2, DF-1, DF-A, and NATO diesel fuel samples were obtained from refineries, bulk storage, and service stations. Aromatic concentrate (AC) products from various sources were evaluated for use in adjusting the total aromatic ring carbon (TARC) content of FRF formulations. Neat base fuel and AC-containing base fuel TARC effects on microemulsification efficacy were established for water containing various amounts of total dissolved solids and for the amide/amine/soap emulsifier with various levels of total acid number.

AD-A117 438/2 PC **A07**/MF **A01**
Suntech, Inc., Marcus Hook, PA.
An Exploratory Research and Development Program Leading to Specifications for Aviation Turbine Fuel from Whole Crude Shale Oil. Part V.
Final rept., 2 Jan 79-1 Feb 82,
H. E. Reif, J. P. Schwedock, and A. Schneider. Mar 82, 142p AFWAL-TR-81-2087-PT-5
Contract F33615-78-C-2024
See also Part 2, AD-A112 682.

A computer model of Sun Tech's upgrading concept for converting 100,000 BPSD of raw Occidental shale oil into aviation turbine fuels has been developed. Using economic guidelines provided by the U.S. Air Force, the total liquid product cost when maximizing JP-4 jet fuel was $1.22/gallon; $1.24/gallon when maximizing JP-8 jet fuel; and $1.19/gallon when producing JP-4 plus other fuels. Sensitivity analysis showed that the price of raw shale oil had the greatest impact on total liquid product costs. (Author)

AD-A117 511/6 PC **A09**/MF **A01**
Ashland Petroleum Co., KY.
Refining of Military Jet Fuels from Shale Oil. Part I. Preliminary Process Design, Economic and Yield Optimization, and Computer Modeling.
Interim technical rept. Feb-Jun 79,
C. A. Johnson, H. F. Moore, and W. A. Sutton. Apr 82, 187p AFWAL-TR-81-2056-PT-1
Contract F33615-78-C-2080

Phase I work performed was directed at the preparation of an overall processing method based on the application of current refining techniques and an extraction process for the removal of nitrogen from shale oil. This preliminary process analysis was aimed at demonstrating technical as well as economic feasibility. This phase explored two overall processing methods, one providing JP-8 type aviation turbine fuel, the other method providing JP-4 type aviation turbine fuel. It was concluded that this process design offers the potential of producing high yields of aviation turbine fuels from shale oil with product costs competitive with or lower than comparable product slates from other shale refineries. Processing steps are provided that will minimize hydrogen consumption, provide a thermal efficiency greater than 70 percent, and produce residual fuel in quantities less than 10 percent of the total product slate. (Author)

AD-A117 526/4 PC **A04**/MF **A01**
Suntech, Inc., Marcus Hook, PA.
An Exploratory Research and Development Program Leading to Specifications for Aviation Turbine Fuel from Whole Crude Shale Oil. Part IV. Production of Samples of Military Fuels from Raw Shale Oils.
Interim rept. 1 Apr 80-30 Nov 81 on Phase 3,
H. E. Reif, J. P. Schwedock, and A. Schneider. Feb 82, 73p AFWAL-TR-81-2087-PT-4
Contract F33615-78-C-2024
Presented at the Jet Fuel from Shale Oil Technology Review (3rd), 17-18 Nov 81, Miamisburg, OH. See also Part 5, AD-A117 438.

A total of 475 gallons of specification aviation turbine fuels (JP-4, JP-5 and JP-8) were prepared from Occidental Shale Oil based on Sun Tech's upgrading concept. Processing consists of six steps: (1) hydrotreating the whole shale oil to partially reduce total nitrogen content to minimize hydrogen consumption; (2) distilling the hydrotreated product into appropriate fractions for additional processing; (3) rehydrotreating the light distillate fraction to meet product specifications; (4) treating the wide boiling gas oil fraction with anhydrous hydrogen chloride (HCl) which yields a low nitrogen content raffinate and a high nitrogen content extract phase; (5) thermally decomposing the extract to recover anhydrous HCl and a nitrogen-rich extract, which is used for generating hydrogen by partial oxidation; and (6) hydrocracking the raffinate phase to maximize aviation turbine fuel yield. Five 5-gallon samples of speci-

fication military fuels were produced from Paraho shale oil (JP-4, JP-5, JP-8, DF-2 and DF Marine) using a modified process. Processing consists of severely hydrotreating raw shale oil followed by fractionation and finally hydrocracking the wide boiling gas oil fraction to produce the desired product slate.

AD-A117 561/1 PC **A03**/MF **A01**
Coordinating Research Council, Inc., Atlanta, GA.
Octane Requirement Increase of 1978 and 1979 Model Cars.
Apr 82, 44p
Contract DAAK70-81-C-0128
Revision of report dated Sep 81.

Octane requirement increase (ORI) was determined for ninety-two 1978 and one-hundred-nine 1979 model cars operated on unleaded gasoline. All ORI values were determined from the increase in maximum octane requirements irrespective of whether requirements were obtained at full- or part-throttle.

AD-A117 613/0 PC **A04**/MF **A01**
Naval Postgraduate School, Monterey, CA.
An Assessment of the Role of Coal in the Long-Term Energy Plan for Korea.
Master's thesis,
Jin Seob Cha. Mar 82, 75p

During the last two decades, Korean industry has been developed very quickly. Energy consumption also has been increased very rapidly by the growth of industry. These energy requirements should be imported from other countries because Korea has few energy sources. Korean energy consumption depends highly on oil, even though oil has less security of supply and a higher price than other energy sources due to the limitation of oil reserves and the oil cartel. The Korean government wishes to import energy sources with more security of supply and a lower price.

AD-A117 746/8 PC **A02**/MF **A01**
Engineering Development Establishment, Maribyrnong (Australia)
Investigation of the Performance of a Ford 4.1 L 6 Cylinder SI Engine Operating on Methonol Iso-Butanol Gasoline Fuel Blends,
D. J. Ayers. 1982, 24p Rept no. EDE-10/82

A laboratory investigation into the relative performance of a Ford Falcon 4.1 L 6 cylinder in line engine when operated on both super grade gasoline and blends of non-leaded gasoline, methanol and iso-butanol showed that the engine operated satisfactorily on fuel blends containing up to 30% total alcohol. For the blends thermal efficiency of the engine for most conditions was improved but some torque loss was experienced under full throttle conditions especially at lower engine speeds. This loss increased with increasing proportion of alcohols in the fuel. (Author)

DE82006146 PC **A04**/MF **A01**
Los Alamos Scientific Lab., NM.
Coal-Powder Characterization and Thermal Analysis.
G. Bennett, and M. Luther. 1982, 54p LA-UR-81-3788, CONF-820409-1
Contract W-7405-ENG-36
Scanning electron microscopy annual meeting, Anaheim, CA, USA, Apr 1982, Portions of this report are illegible.

The laser, which produces extremely fast heating rates, initiates primary pyrolysis reactions that are effectively quenched after a pulse, thus minimizing secondary reactions. A continuous (cw) CO sub 2 laser has been used to pyrolyze crushed coal samples in a helium atmosphere. The unsieved coal used in the experiments is characterized to define an average particle diameter and the distribution of diameters. This statistical information is used in several finite element numerical models to predict the temperatures and heating rates that occur in the sample and in individual particles during an experiment. The calculation of the peak temperature reached on the sample surface correlates well with experimental measurements. The numerical model predicts the correct shape of the temperature fields but does not account for differences observed in the amount of coal undergoing pyrolysis as a function of average particle diameter. Scanning electron microscopic (SEM) examination of coal samples after laser pyrolysis indicates that the powder cannot be accurately modeled as a single-phase continuum, but must be considered on a smaller, or particle level scale. Trends predicted in the idealized coal particle models are confirmed with the SEM observation. (ERA citation 07:049072)

DE82008085 MF **A01**
Department of Energy, Bartlesville, OK. Bartlesville Energy Technology Center.
Diesel Fuel Oils, 1981.
E. M. Shelton. Dec 81, 37p DOE/BETC/PPS-81/5
Portions of document are illegible.
Microfiche copies only.

Properties of diesel fuels produced during 1981 were submitted for study and compilation under a cooperative agreement between the Department of Energy (DOE), Bartlesville Energy Technology Center (BETC), Bartlesville, Oklahoma and the American Petroleum Institute (API). Tests of 160 samples of diesel fuel oils from 77 refineries throughout the country were made by 26 petroleum groups according to type of diesel fuel. Each group of analyses is subdivided into five tabulations according to five general regions of the country where the fuels are marketed. The regions, containing a total of 16 districts, are shown on a map in the report. Data from 13 laboratory tests on each individual diesel fuel sample are listed and arranged by geographic marketing districts in decreasing order of sales volumes. Charts are included showing trends of averages of certain properties for the four types of diesel fuels for the years 1960 to 1981. Summaries of the results of the 1981 survey, compared with similar data for 1980, are shown. (ERA citation 07:045720)

DE82008681 MF **A01**
Cooper Union Research Foundation, New York.
Computer Analysis of Entrainment Flow Gasification Phenomena. Quarterly Technical Progress Report No. 2, November 10, 1981-February 10, 1982.
S. I. Cheng. 1982, 17p DOE/MC/16433-T2
Contract AC21-81MC16433
Portions of document are illegible.
Available in microfiche only.

During this quarter, in addition to the detailed examination of subroutines, a new vapor-phase phase imperfection subroutine was developed. The calculation of physical properties of coal was incorporated, and the kinetics subroutine was modified to determine whether a reaction is diffusion rate controlling. Each of the areas is being reported below. (ERA citation 07:042045)

DE82009578 MF **A01**
Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.
Feasibility Study for Wood-Energy Utilization in the Southeast.
Aug 79, 446p SSEC/TP-43168
Contract AC02-79CS30166
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

The availability of wood as a fuel in the Southeast is considered. Recent developments in methods for harvesting energy wood are described briefly and a discussion of the economics of this harvesting is included. A comprehensive survey of the state-of-the-art of wood energy hardware today is presented, with an emphasis on industrial applications. The results of a survey made to help assess the penetration of wood energy into industrial markets are included. Possible impacts of increased wood energy use in Georgia and the Southeast are discussed. (ERA citation 07:042860)

DE82010302 PC **A02**/MF **A01**
Battelle Columbus Labs., OH.
Synthetic-Fuel Aromaticity and Staged Combustion. Fifth Quarterly Technical Progress Report, October 1, 1981-December 31, 1981.
A. Levy, J. R. Longanbach, and L. K. Chan. 31 Jan 82, 20p DOE/PC/30302-5
Contract AC22-80PC30302

The objectives of the five tasks are as follows: (1) determine the volatility and to characterize the aromatic and fuel-N compounds present in a typical synfuel; (2) determine the aromatic and fuel-N characteristics of narrow (50 exp 0 C) distillation cuts of synfuel as a function of time, temperature and oxygen level; (3) determine the ease of oxidation of the pyrolysis products; (4) define the burning characteristics of synfuel as a function of equivalence ratio, temperature and residence time in two-stage combustion; (5) apply the results from Tasks 2, 3 and 4 into existing models for soot and NO/sub x/ formation in flames. Results obtained on total nitrogen analyses of the fuels and condensable products have been found to lack needed precision and accuracy. Test samples are currently being analyzed by a third laboratory. A similar series of test done to evaluate the titration method for the determination of basic nitrogen has shown excellent precision and accuracy. Pyrolysis and oxidative experiments have been extended to 1100 exp 0 C ad the percent of stoichiometric oxygen to 70% of the oxygen required for complete combustion. The resulting condensible products require changes in the procedures previously used for analysis because they contain solids and/or significant amounts of water. No analytical results are available at this time. A two-staged combustor capable of burning up to 0.5 gal SRC II per hour has been built for the Task 4 experiments. The combustor is designed with a secondary air inlet and sampling probes for liquid and gaseous products. (ERA citation 07:042144)

DE82012310 MF **A01**
Solar Energy Research Inst., Golden, CO.
Photobiology Task of the Advanced Solar Energy Research Program. Progress Report, 1 April 1980-30 September 1980.
M. Seibert, S. Lien, P. Weaver, J. Schultz, and P. Roessler. Mar 82, 48p SERI/PR-233-1395
Contract AC02-77CH00178
Available in microfiche only.

Three areas of photobiological research are currently under investigation: in vivo microbial hydrogen photoproduction, algal hydrocarbon production, and in vitro energy conversion. The first involves environmental and mutational analyses of metabolism and electron transport in photosynthetic bacteria, leading to enhanced hydrogen photoproduction by these organisms. Also included in the first area is the characterization of algal hydrogenases and both the biochemical and genetic manipulation of algal electron transport to enhance in vivo hydrogen photoproduction. The second seeks to identify algal strains that produce large amounts of oil or hydrocarbons and to understand the mechanisms and biochemistry involved. The third is aimed at electrically coupling photoactive biological complexes to metal and semiconductor electrodes. Highlights of the work of the past six months include: (1) the discovery that photosynthetic bacteria can use a number of natural biomass sources as substrates for hydrogen photoproduction; (2) the recovery of 4.8% to 5.7% of incident radiant energy as combustible hydrogen by photosynthetic bacteria; (3) the characterization of two newly identified dark growth modes of photosynthetic bacteria;. (ERA citation 07:042834)

DE82012338 PC **A04**/MF **A01**
Colorado School of Mines, Golden. Dept. of Chemical and Petroleum Refining Engineering.
Mechanisms and Kinetics of Coal Hydrogenation.
R. M. Baldwin. Mar 82, 62p DOE/ET/14881-8
Contract AC22-79ET14881
Portions of document are illegible.

Data for coal hydrogenation in the presence of added H sub 2 S, pyrite, and H sub 2 S + pyrite are shown in Table 15 along with baseline data for hydrogenation without the use of additives. What is perhaps most striking about these data is the influence of added H sub 2 S in absence of added pyrite. The percentages of H sub 2 S refer to the mole % H sub 2 S in the gas atmosphere prior to heating and reaction (cold composition). A 56% increase in overall conversion is indicated at the 10 minute residence time, with a 21% increase at 60 minutes when gaseous H sub 2 S alone is added to the reaction gas atmosphere. The predominate influence on product distribution is in the preasphaltene fraction, especially at the short residence time. Clearly, H sub 2 S is acting as a catalyst for coal liquefaction at these conditions. Concentrations above 2% H sub 2 S in the initial gas phase mixture do not seem to appreciably increase the conversion; the effect noted at 60 minutes between 5% and 10% may not be significant due to scatter in the data. The function of H sub 2 S in this case may be as either a homogeneous or heterogeneous catalyst. Rebick has reported a catalytic effect of H sub 2 S on a n-hexadecane pyrolysis, and attributed the noted effect to catalysis of hydrogen transfer. Since the early stages of coal liquefaction are thought to proceed via free radi-

cal chemistry, a similar effect may be operative here. (ERA citation 07:042023)

DE82012343 PC **A04**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Bench-Scale Studies of Biomass Liquefaction with Prior Hydrolysis.
S. Ergun, and N. Yaghoubzadeh. Feb 82, 67p LBL-12543
Contract W-7405-ENG-48

The liquefaction experiments were conducted batch-wise using autoclaves. The oils produced in batch experiments were poor in quality, i.e., they solidified at room temperature and contained excessive amounts of acetone insoluble material, compared to oils produced in flow mode at the biomass liquefaction test facility at Albany, Oregon and in the process evaluation unit of LBL. Possible causes of the differences in the quality and yields of oils are differences in the synthesis gas pressure initially imposed, and the rate of heating to the reaction temperature during which irreversible reactions can take place, as well as differences in gas/liquid contacting.

DE82012356 PC **A05**/MF **A01**
Pennsylvania State Univ., University Park. Coal Research Section.
Data Base for the Analysis of Compositional Characteristics of Coal Seams and Macerals. Quarterly Technical Progress Report for the Period, May-July 1981.
A. Davis. Feb 82, 76p DOE/PC/30013-6
Contract AC22-80PC30013
Portions of document are illegible.
Microfiche only after original copies are exhausted.

The first objective of the program is to understand the systematic relationships between the properties of coals and the second is to determine the nature of lateral and vertical variability in the properties of a single seam. Five whole seam channel samples were collected from Illinois. Eighty-three coal samples and 120 printouts were provided on request to the coal research community. The equation $Q = 145\,C + 610\,H - 65\,O - 20$ where Q is the calorific value, and C, H and O are the carbon, hydrogen and oxygen contents, respectively, appears to provide the best means of estimating calorific value from ultimate analyses of coals in the Penn State Coal Data Base, regardless of the basis on which analyses are reported. Trends in the lateral variability of petrographic composition of Lower Kittanning seam samples are presented. Distinct trends in the composition and properties within a single coal seam enabled the areal changes in depositional environment and post-depositional metamorphic changes to be investigated. Descriptive univariate statistics and frequency distributions of the major elements in coal ash are presented. All whole seam channel samples with major element concentrations included in the data base have been used. Fe, Mg, Ca, Na, K, and S have different distributions in the major coal provinces. Bivariate analysis was performed on the FTIR data of 24 vitrinite concentrates. The possibility of using the information in a multivariate analysis is under study. Swelling of coals and vitrinite in methanol and water has been studied by comparing the sorption of these solvents using pycnometric and gravimetric techniques.

DE82012576 PC **A07**/MF **A01**
Wisconsin Univ.-Madison.
Fuel-Composition and -Vaporization Effects on Combustion-Chamber Deposits.
P. S. Meyers, O. A. Uyehara, and R. DeYoung. Dec 81, 143p DOE/CS/50020-1
Contract FG01-79CS50020
Microfiche only after original copies are exhausted.

It is known that gasoline extracted from coal and shale oil sources has higher end point fraction and higher aromatic content (hereafter known as HEPHAG) than typical normal end point gasoline (NEPG). Further, it is known that these HEPHAG can cause objectionable combustion chamber deposits (CCD). It was of practical interest (and the purpose of this thesis) to investigate whether HEPHAG would give acceptable combustion chamber deposits (i.e. comparable to NEPG) if introduced into a S.I. engine in a vaporized and homogeneous (gas phase) form. An analysis of the single cylinder results showed that regardless of the fuel, CCD decreased significantly when the fuel-air charge conditions were judged to be primarily gas phase. However, HEPHAG required a higher fuel-air charge temperature (FACT) than NEPG to realize this gas phase condition. An analysis of the multicylinder results showed that the vortex helped approach an equilibrium condition. Also, under conditions of high FACT and using the vortex, there was little difference in CCD formation between HEPHAG and NEPG tests. However, it is not clear that these fuels would have equivalent equilibrium deposit thickness. In the light of the results found, it was concluded that the presence of condensed phase fuel in the intake manifold increases CCD. Further, CCD can be significantly reduced by increasing the FACT and ensuring that equilibrium is approached in the intake manifold (increased vaporization). It was also concluded that for a warm engine HEPHAG type fuels can be burned without excessive CCD at equilibrium engine operating condition. However, temporarily cold manifold conditions (cold starts) may significantly increase long term CCD formation. The data indicate that the most crucial fuel components in deposit formation are the very last of the high boiling fractions. (ERA citation 07:042692)

DE82012840 PC **A07**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Gas Supplies of Interstate Natural Gas Pipeline Companies - 1980.
T. A. Pappas. Dec 81, 148p DOE/EIA-0167-80
Portions of this report are illegible.
Microfiche only after original copies are exhausted.

This report on the gas supplies of interstate natural gas pipeline companies provides a statistical summary of the year-end 1980 total reserves and deliverability capabilities of the interstate pipeline companies developed from the FPC Form 15, Annual Report of Gas Supply. The report is based on data from Form 15 reports filed by the 92 pipeline companies required to report on their gas supplies in 1980. The data on dedicated in-the-ground gas reserves (company-owned and/or purchased from independent producers) are from reports filed by 64 of these companies. The remaining 28 companies purchase all their gas supply from other pipeline companies who are respondents or from foreign suppliers. The gas supplies of interstate pipeline companies consist of the certificated, dedicated, recoverable, salable natural gas available from the domestic in-the-ground reserves, gas purchase contracts with other interstate pipeline companies, imported gas and synthetic natural gas (SNG). The domestic in-the-ground reserves include (1) company-owned reserves, (2) reserves dedicated or warranted under contracts with independent producers, and (3) supplemental or short-term supplies purchased from independent producers and intrastate pipeline companies. The purpose of this report is to provide information to the FERC, to other regulatory agencies, to the public and to fulfill the data collection responsibilities of the EIA. (ERA citation 07:042335)

DE82012901 MF **A01**
Gulf Science and Technology Co., Pittsburgh, PA. Chemical and Minerals Div.
Effects of Components of Synfuels on Soot Formation. Quarterly Technical Progress Report No. 5, October 1-December 31, 1981.
Mar 82, 57p DOE/PC/30307-5
Contract AC22-80PC30307
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The objective of this project is to test the effects of the chemical components of coal liquid fuels on soot formation using bench-scale premixed flat flames of the vaporized liquids. The cellular spatial flame inhomogeneities usually occurring in such flames were suppressed by a co-feed of ethylene. Model coal liquid components were tested. Pyridine produced no soot, in great contrast to toluene. To isolate various coal liquid components such as mono-, di-, and triaromatics, narrow boiling distillation fractions were collected with boiling midpoints between 180 and 650 exp 0 F, and four fractions with boiling midpoints between 180 and 385 exp 0 F were tested for sooting. The results showed trends of increasing soot yields with increasing aromatics content and boiling midpoints, but also exceptions which need more detailed testing. Compositional analyses of some fractions by mass spectrometry and capillary gas chromatography were also begun, and clarified the types of separations, chromatography, and spectrometry most needed for compositional data to correlate with the sooting results for the fractions. (ERA citation 07:042146)

DE82012924 MF **A01**
Hodel (Gene E.), Roanoke, IL.
Ethanol Production from Corn Screenings. Final Report.
1982, 11p DOE/AF/92001-1
Portions of document are illegible.
Available in microfiche only.

The feasibility of on-farm production of ethanol from corn screenings is explored. A comparison of ethanol production from whole corn and screenings was done from an economic standpoint. The ethanol plant is described and illustrated. (ERA citation 07:042766)

DE82902042 MF **A01**
Florida Univ., Gainesville. Inst. of Food and Agricultural Sciences.
Alternative Energy Sources for Florida.
W. H. Smith. Dec 79, 160p CONF-791279-
Conference on alternative energy sources for Florida, Gainesville, FL, USA, 5 Dec 1979, Portions Of Document Are Illegible.
Available in microfiche only.

Sixteen papers are included. A separate abstract was prepared for each one. (ERA citation 07:050648)

DE82902375 PC **A06**/MF **A01**
Mineraloelwirtschaftsverband e.V., Hamburg (Germany, F.R.).
Annual Report 1980 of the Mineraloelwirtschaftsverband, Arbeitsgemeinschaft Erdoel-Gewinnung und -Verarbeitung.
1980, 117p NP-2902375
In German.
U.S. Sales Only.

After a report on the situation of the mineral oil industry, the role of mineral oil in the power industry is reviewed. Information is given on mineral oil supplies in West Germany, mineral oil sales, environmental protection, as well as legal and technical aspects of mineral oil. The appendix of tables contains detailed figures on the major development lines and structures of mineral oil supply and sales. (ERA citation 07:042303)

DE82902835 PC **A03**/MF **A01**
Netherlands Energy Research Foundation ECN, Petten.
Oil Substitution in the Netherlands.
R. Bosma, and F. van Oostvoorn. Jan 81, 35p ESC-4-Rev.
Portions of this report are illegible.
U.S. Sales Only.

This preliminary study has clearly demonstrated the importance of oil substitution and indicates that more knowledge is needed on the subject in the Netherlands. The Energy Study Center intends to take a more in depth view on this subject during 1981. In the first chapter the main characteristics of the Dutch energy system are given to illustrate Dutch long-term policies and problems. Chapter two gives two energy scenarios, representing the actual governmental view on possible options for the Netherlands. It is stressed here that these scenarios only serve as a framework for discussion of the topic of oil substitution. Chapter three gives the economist's view on the oil-substitution case and also presents some general facts and figures regarding oil. Chapter four again concentrates on the topic of replacement of oil and gas, focussed on the problems of a large coal input. The obstacles concerning oil and gas substitution by coal will also be discussed. In the final chapter the main conclusions are given. (ERA citation 07:043866)

N82-27519/9 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Effect of Some Nitrogen Compounds Thermal Stability of Jet A.
A. C. Antoine. Jun 82, 20p NASA-TM-82908, NAS 1.15:82908

The effect of known concentrations of some nitrogen containing compounds on the thermal stability of a conventional fuel, namely, Jet A was investigated. The concentration range from 0.01 to 0.1 wt% nitrogen was examined. Solutions were made containing, individually, pyrrole, indole, quinoline, pyridine, and 4 ethylpyridine at 0.01, 0.03, 0.06, and 0.1 wt% nitrogen concentrations in Jet A. The measurements were all made by using a standard ASTM test for evaluating fuel thermal oxidation behavior, namely, ASTM D3241, 'thermal oxidation stability of turbine fuels (JFTOT procedure).' Measurements were made at two tempera-

ture settings, and 'breakpoint temperatures' were determined. The results show that the pyrrole and indole solutions have breakpoint temperatures substantially lower than those of the Jet A used.

N82-27857/3 PC **A08**/MF **A01**
Bayerisches Landesamt fuer Wasserwirtschaft, Munich (Germany, F.R.).
Investigation into the Economy of Methane Gas Utilization in Sewage Treatment Plants.
Final Report.
P. Wolf. Mar 82, 154p BMFT-FB-T-82-025, ISSN-0340-7608
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

The economic feasibility of methane gas utilization in small and medium sized sewage treatment plants was studied. Assuming that rising energy costs make this energy source attractive, existing and theoretical model plants of various sizes were investigated by considering different price scales for electric power and fuel oil. This was done with variation of the kind of biological sewage treatment, sludge treatment, and of kinds and facilities of methane gas utilization. Results show that using methane gas for power generation is relatively economic in comparison to alternative methods of gas utilization for treatment plants bigger than 50,000 population equivalent.

PB82-191925 CP **T02**
Department of Energy, Washington, DC. Energy Information Administration.
Cost and Quality of Fuels for Electric Utilities Form 423/Historic.
Data file,
Richard Salkov, and Ray Marcotte. Dec 81, mag tape DOE/DF-82/012
Supersedes PB81-121690.
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions.

The data file contains information on the cost and quality of fossil fuels for electric utility plants on a plant-by-plant basis grouped on a State and regional basis permits comparison of prices for similar fuels delivered to other plants in the same state and region Data are limited to electric utility/generating plants in the United States with a combined capacity of 25 megawatts or greater. The data file is a continuation of the annual series by the same title that originated in the Federal Power Commission. Fossil fuels include oil, coal, and natural gas. Reported are data on fuels delivered to peaking units such as combustion turbines, to internal combustion units, to steam-electric plants, and to fossil fuel plants. Aggregates include each of the Census Regions, Bureau of Mines Coal Producing Districts, and total United States. Pennsylvania anthracite is shown separately. There are data on imports by country of origin and State of destination. Also provided are data for comparing 1978 Sulfur Regulations with sulfur content of coal delivered. The data file is arranged in five parts each containing a narrative that explains the data and highlight trends. Five of the seven appendices are devoted to data on the 20 largest electric utility companies. There are 60 tables.

PB82-233958 PC **A03**/MF **A01**
Sentralinstitutt for Industriell Forskning, Oslo (Norway).
Spesielle Katalytiske Metanreaksjoner. En Litteraturoversikt (Special Catalytic Methand Reactions: A Literature Survey(.
Final rept.,
Gerd S. Haegh, and Elizabeth Baumann Ofstad. 28 Dec 81, 27p 81-02-08-3, ISBN-82-7267-416-5
Text in Norwebian.

A literature survey concerning catalytic methane reactions of potential interest for future utilization of natural gas is carried out. The survey is limited to non-cmmercialized reaction types, which however are currently being investigated by many research of higher hydrocarbons from methane is given special attention, due toits otential usefulness in the producetion of energy products. Thermodynamic considerations are included.

PB82-250697 PC **A07**/MF **A01**
Transamerica Delaval, Inc., Oakland, CA. Engine and Compressor Div.
Emulsified Fuel Testing in a Medium Speed Diesel Engine.
Final rept. Feb 81-Apr 82,
J. J. Barich, T. L. Hinrichs, and K. R. Pearce. Jun 82, 137p MA-RD-920-82069
Contract MA-80-SAC-01059

Medium-speed diesel engine testing of fuel-water emulsification with various grades of diesel fuel was conducted in order to determine the effect of water emulsification on engine performance. Emulsions from 0 to 12% water (by volume) were test run with various water particle sizes, injection timings, and engine loads with four separate fuels: Marine diesel, 1500 SR1, 3500 SR1, and 5000 SR1. Experimental results are presented for the basic engine performance areas for the various conditions run, focusing mainly on the effects of water emulsification on fuel consumption, exhaust emissions, and engine component wear rates. Details of the emulsification system are also discussed.

PB82-252750 PC **A07**/MF **A01**
National Dairy Research Inst., Karnal (India).
Janata Biogas Technology and Fodder Production,
S. Neelakantan. 1981, 139p
Sponsored in part by Ministry of Agriculture, New Delhi (India).

An effective bio-gas program leads to efficient use of cow dung for gas recovery and partial supplement to plant nutrient requirements. Bio-gas program leads to improvement in rural living including rural sanitation. The Janata biogas plant designed by the State Planning Institute, Lucknow, based on biogas technology, has proved to be efficient and economical. This book contains the various papers presented at the seminar held to review this technology. The various topics covered are: Status of Biogas Program in India; Role of Extension Agencies in Developing Program of Energy Utilization; Introduction to Drumless Biogas Plant; Principles and Application of Anaerobic Fermentation and Biogas Production, Operational System of Gobar Gas in Rural India; Complete Recycling of Cattle Shed Wastes through Biogas Plant; Chemical Composition of Cattle Excreta and Its Manurial Value; Profitability of Biogas Plant; Biogas Production from Various Organic Wastes; Performance of Janata Biogas Plant and Biogas Utilization in Appliances; Utilization of Solar Energy for Domestic Purposes; and Conservation of Forages. Plant requirements and cost estimates have been given for several units.

PB82-254616 PC **A02**/MF **A01**
Texas A and M Research Foundation, College Station.
Thermodynamic Properties for Natural Gas Binaries.
Final rept. 1 Dec 80-31 Dec 81,
Kenneth R. Hall, and James C. Holste. Jan 82, 19p
Grant GRI-5080-363-0362

The report describes experimental measurements of dew and bubble points for a CO2-C2H6 mixture and for CO2 containing small amounts of methane and/ or nitrogen. The apparatus is a Burnett-isochoric PVT device. Experimental technique improvements allow accurate determination of the phase boundaries.

PB82-254830 PC **A05**/MF **A01**
Jensen Associates, Inc., Boston, MA.
The Costs of Gas Service to Residential and Other Users.
Final rept. Mar 81-Feb 82,
J. C. Loose, and N. J. Pozar. Feb 82, 100p GRI-81/0111
Contract GRI-5080-310-0413

This study disaggregates the costs incurred by distribution and transmission companies in providing gas service to users. A breakdown of gas operation and maintenance expenses for about 100 cost categories is provided based on 1979 cost information from 85 gas companies located throughout the United States. Unit costs expressed principally as dollars per thousand cubic feet of gas sales are provided in the report for the various cost categories. Depending on geographical location and type of company, unit costs for the sample companies are shown to vary widely. The reasons for these variations include physical differences in gas company delivery systems, variations among companies in accounting practices and company policies, lack of standardization in defining costs, as well as differences stemming from the geographical location and regulatory environment in which the company operates. Historical trends in the costs of gas service are presented and projected cost trends are also discussed. Based on the findings of this study, recommendations for research opportunities for the Gas Research Institute are also included.

PB82-255290 PC **A06**/MF **A01**
Brooklyn Union Gas Co., NY.
Landfill Gas to Electricity Demonstration Project.
Final rept.,
A. J. Giuliani, and L. A. Cagliostro. Mar 82, 102p NYSERDA-82-2
Sponsored in part by Department of Energy, Washington, DC.

Medium Btu methane gas is a naturally occurring by-product of anaerobic digestion of landfilled municipal solid waste. The energy potential of landfill gas in New York State is estimated to be 61 trillion Btu's per year or the equivalent of 10 percent of the natural gas used annually in the State. The 18-month Landfill Gas to Electricity Demonstration Project conducted at the Fresh Kills Landfill in Staten Island, New York conclusively demonstrated that landfill gas is an acceptable fuel for producing electricity using an internal combustion engine/generator set. Landfill gas proved to be a reliable and consistent fuel source during a six-month field test program. Engine exhaust emissions were determined to be comparable to that of natural gas and no unusually high corrosion rates on standard pipeline material were found.

PB82-262536 PC **A05**/MF **A01**
Institute of Gas Technology, Chicago, IL.
Identification of Leaks - Internal Acoustic Technique.
Final rept. Nov 80-Jan 82,
J. E. Huebler, N. C. Saha, and J. M. Craig. Aug 82, 89p GRI-80/0143
Contract GRI-5080-352-0359

A sensitive microphone was used inside of a simulated low-pressure gas main to determine the feasibility of detecting, pinpointing, typing, and sizing small leaks in gas distribution systems. Spectral analysis over the frequency range of 0 to 100,000 Hz was used to obtain information about the leak signals. Findings indicate that leaks can be detected at pressures as low as 2 inches of water column (0.072 psi) or at flow rates less than 2 SCF/h. Leaks can be pinpointed to within plus or minus 6 inches, and several types of soil conditions around the pipe have minimal effects on the detectability of the leak signals. Characteristic spectra of simulated leak types as well as comparison of these spectra to simple models are also given. The effects of pipe diameter and the position of the microphone in the main are also discussed.

PB82-262544 PC **A03**/MF **A01**
Southern Illinois Univ. at Carbondale. Coal Extraction and Utilization Research Center.
Development of GRI Standard Coal Reference Sample.
Annual rept. Mar 81-Feb 82,
W. S. Sanner, Jr. Feb 82, 48p GRI-81/0062
Contract GRI-5080-361-0419

A rank spectrum of coal samples will be selected, characterized and then stored under several different sets of conditions. At various times throughout the project, fractions of the stored coals will be characterized and the resultant data will suggest the relative ability of each environment to preserve stored coal. Material handling skills will be developed for application to a large-size (1 ton) coal sample and sufficient information will be developed to propose an operation system for a national coal repository. All of this year's achievements have been preparatory to the actual sample collection and course of the experiments; however, these activities are both necessary and important. First, many ideas were congealed and/or rethought as a result of the USDOE/GRI Atlanta Sample Bank Workshop; therefore a major part of the first year's activity was the resolidification of the project direction after that meeting. Second, all aspects of the controlled coal handling facilities are nearly completed and installed in the laboratories. Third, the coal characterization test roster has been specifically selected for the express purpose of evaluating the ability of each storage mode to preserve the coal. The labs have been upgraded with the necessary test equipment and a computer-based data management system is ready to receive test results.

PB82-873191 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Tar Sands. 1970-August, 1982 (Citations from the NTIS Data Base).
Rept. for 1970-Aug 82.
Aug 82, 104p
Supersedes PB82-855289.

This bibliography contains citations concerning the mining and recovery processes of tar sands and the production of tar sand derivatives. The application of tar sands to energy production is included. (This updated bibliography contains 76 citations, 12 of which are new entries to the previous edition.)

PB82-873324 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Fermentation Processes: Alcohol Fuels. 1976-August, 1982 (Citations from the Energy Data Base).
Rept. for 1976-Aug 82.
Aug 82, 320p
Supersedes PB82-854993.Prepared in cooperation with the Department of Energy, Washington, DC.

This bibliography contains citations concerning the principles of fermentation techniques to yield the highest alcohol content. Processes, technology, and operation of fermentation facilities are included. (This updated bibliography contains 314 citations, 93 of which are new entries to the previous edition.)

PB82-873332 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Fermentation Processes: Alcohol Fuels. 1970-August, 1982 (Citations from the NTIS Data Base).
Rept. for 1970-Aug 82.
Aug 82, 174p
Supersedes PB82-854985.

This bibliography contains citations concerning the principles of fermentation techniques to yield the highest alcohol content. Technical and economic feasibility studies are included. (This updated bibliography contains 120 citations, 21 of which are new entries to the previous edition.)

PB82-873795 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Tar Sands: Crude Oil Extraction Processes. 1976-August, 1982 (Citations from the Energy Data Base).
Rept. for 1976-Aug 82.
Aug 82, 245p
Prepared in cooperation with the Department of Energy, Washington, DC.

This bibliography contains citations concerning methods and equipment for extracting crude oil from tar sands. Solvent extraction and cold and hot water seperation methods are among the recovery processes discussed. Pilot and field operations are considered. (Contains 280 citations fully indexed and including a title list.)

21E. Jet and Gas Turbine Engines

AD-A117 668/4 PC **A04**/MF **A01**
General Motors Corp., Indianapolis, IN. Detroit Diesel Allison Div.
Separated Diffuser Flow Analysis. Volume I.
Final rept. 11 Aug 80-13 Jul 81,
Harold L. Stocker, Thomas E. Scott, C. F. Shieh, and John E. Caruthers. Sep 81, 63p DDA-EDR-10671, AFWAL-TR-81-2086-VOL-1
Contract F33615-80-C-2063

This report describes a finite difference computer program TASED (Turbulent Annular Sudden-Expansion Diffuser), which predicts flow properties in an axisymmetric annular duct of arbitrary shape which contains an arbitrarily shaped axisymmetric annular centerbody in the duct exit. The centerbody may contain openings through which air is allowed to flow. A two-equation TKL (Turbulent Kinetic Energy and Length Scale) turbulence model is used which was specifically developed for separated recirculation flows. The calculation procedure is programmed in the FORTRAN IV language and has operated successfully on the IBM 370, CDC, CYBER 750, and DEC VAX 11/780 computers. This report presents the equations which form the analytical basis for the TASID computer program and describes the resulting computer program including the input preparation and the resulting computer program including the input preparation and the resulting output. A comparison is made between experimental data and calculated results for several test cases.

AD-A117 807/8 PC **A04**/MF **A01**
General Motors Corp., Indianapolis, IN. Detroit Diesel Allison Div.
Life Utilization Criteria Identification in Design (LUCID).
Final rept. Sep 78-Dec 81,
J. E. Holmes. Jun 82, 68p EDR-10982, AFWAL-TR-82-2039
Contract F33615-78-C-2072

LUCID has developed and demonstrated the capability to predict realistic engine usage during the conceptual design phase of a gas turbine design cycle. A method has been developed and demonstrated to include life and usage considerations as well as performance aspects in the process of selecting the optimal engine and aircraft definitions for an advanced military high performance application. This process also defines usage and life data for subsequent design and development efforts on the selected engine. These LUCID techniques allow trade-offs of engine life and performance parameters to be identified. (Author)

AD-A117 926/6 PC **A06**/MF **A01**
Pratt and Whitney Aircraft Group, West Palm Beach, FL. Government Products Div.
Augmentor Stability Management Program.
Final rept. 1 Sep 79-30 Sep 81,
R. C. Ernst. Feb 82, 118p PWA-FR-15477, AFWAL-TR-82-2001
Contract F33615-79-C-2059

A model has been developed which predicts the efficiency and low frequency stability of a turbofan augmentor. The model evaluates the stability characteristics of the flameholders at low inlet temperature with a model for two-phase fuel flames. The driving potential for low frequency instability is identified with excessive flameholder wake fuel-air ratio. The model is compared to engine experience, available literature and other models with favorable results. (Author)

DE82011259 MF **A01**
Dutcher Industries, Inc., San Diego, CA.
System Optimization of a High Efficiency Steam Engine. Task 2 and Final Report.
P. Schneider. Nov 81, 80p DOE/NBM-1001
Contract FG01-80CS50225
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This project was initiated as a logical follow on to prior efforts by the State of California in the development of low pollution, external combustion steam engines. The program was funded with a grant from the US Department of Energy to the California Department of Transportation (CAL TRANS). CAL TRANS contracted with Dutcher Industries, Inc. of San Diego to accelerate the improvement of the efficiency of Rankine cycle (steam) engines. More specifically this project dealt with the thorough testing and documentation of the performance of a steam engine which had been built during a previous program. The engine system was tested and evaluated during 1981. The peak thermal efficiency was 24%, which was less than the project goal of 27%, but was higher than any measured previously. It is projected that further refinements and modifications would increase the peak thermal efficiency to 27%, and that development of a three stage engine (the current one is two stage) would result in a peak thermal efficiency of up to 30%. (ERA citation 07:050803)

N82-27309/5 PC **A07**/MF **A01**
Pratt and Whitney Aircraft Group, East Hartford, CT.
Performance Deterioration Due to Acceptance Testing and Flight Loads; JT9D Jet Engine Diagnostic Program.
W. J. Olsson. 22 Jan 82, 147p NASA-CR-165572, NAS 1.26:165572
Contract NAS3-20632

The results of a flight loads test of the JT9D-7 engine are presented. The goals of this test program were to: measure aerodynamic and inertia loads on the engine during flight, explore the effects of airplane gross weight and typical maneuvers on these flight loads, simultaneously measure the changes in engine running clearances and performance resulting from the maneuvers, make refinements of engine performance deterioration prediction models based on analytical results of the tests, and make recommendations to improve propulsion system performance retention. The test program included a typical productin airplane acceptance test plus additional flights and maneuvers to encompass the range of flight loads in revenue service. The test results indicated that aerodynamic loads, primarily at take-off, were the major cause of rub-indicated that aerodynamic loads, primarily at take-off, were the major cause of rub-induced deterioration in the cold sectin of the engine. Differential thermal expansion between rotating and static parts plus aerodynamic loads combined to cause blade-to-seal rubs in the turbine.

N82-27310/3 PC **A05**/MF **A01**
General Electric Co., Cincinnati, OH. Aircraft Engine Business Group.
Core Compressor Exit Stage Study, Volume 6.
Final Report, Oct. 1976 - Dec. 1981.
D. C. Wisler. Dec 81, 97p NASA-CR-165554, NAS 1.26:165554
Contract NAS3-20070

Rear stage blading designs that have lower losses in their endwall boundary layer regions were studied. A baseline Stage A was designed as a low-speed model of stage 7 of a 10-stage compressor. Candidate rotors and stators were designed which have the potential of reducing endwall losses relative to the baseline. Rotor B uses a type of meanline in the tip region that unloads the leading edge and loads the trailing edge relative to the baseline rotor A designs. Rotor C incorporates a more skewed (hub strong) radial distribution of total pressure and smoother distribution of static pressure on the rotor tip than those of rotor B. Candidate stator B embodies twist gradients in the endwall region. Stator C embodies airfoil sections near the endwalls that have reduced trailing edge loading relative to stator A. The baseline and candidate bladings were tested using four identical stages to produce a true multistage environment. Single-stage tests were also conducted. The test data were analyzed and performances were compared. Several of the candidate configurations showed a performance improvement relative to the baseline.

N82-27311/1 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
QCSEE under-the-Wing Engine Acoustic Data.
H. E. Bloomer, and N. E. Samanich. May 82, 28p E-972, NAS1.15:82691, NASA-TM-82691

Both an over-the-wing (OTW) and an under-the-wing (UTW) experimental engine are discussed. The UTW engine had a variable-geometry fan exhaust nozzle and a variable-pitch fan that provided quick-response reverse thrust capability. An automatic digital control enabled optimal engine operation under all steady-state conditions as well as during forward and reverse thrust transient operation. The engine was tested at the Engine Noise Test Facility alone and with wind and flap segments to simulate an installation on a short-haul transport aircraft. The engine acoustic configuration was varied to give 14 test configurations. All of the acoustic test results from the UTW program at Lewis are presented as 1/3-octave-band sound pressure level (SPL) tabulations for all of the test points and some narrow-band spectra and 1/3-octave-band data plots for selected conditions.

N82-27686/6 PC **A03**/MF **A01**
Pennsylvania State Univ., University Park. Turbomachinery Lab.
Three Dimensional Flow Field Inside Compressor Rotor, Including Blade Boundary Layers.
Semiannual Progress Report.
J. M. Galmes, M. Pouagere, and B. Lakshminarayana. Jun 82, 78p NASA-CR-169120, NAS 1.26:169120
Grant NSG-3266

The Reynolds stress equation, pressure strain correlation, and dissipative terms and diffusion are discussed in relation to turbulence modelling using the Reynolds stress model. Algebraic modeling of Reynolds stresses and calculation of the boundary layer over an axial

cylinder are examined with regards to the kinetic energy model for turbulence modelling. The numerical analysis of blade and hub wall boundary layers, and an experimental study of rotor blade boundary layer in an axial flow compressor rotor are discussed. The Patankar-Spalding numerical method for two dimensional boundary layers is included.

N82-27763/3 PC **A02**/MF **A01**
Canada Inst. for Scientific and Technical Information, Ottawa (Ontario).
Vibration Detection of a Transverse Crack in a Rotating Machine Shaft.
J. C. Sol. 1982, 16p ISSN-0077-5606, NRC/CNR-TT-2018
Transl. into English from Mec., Mater., Electr. (France), No. 371/372, 1980 p 404-409.

The vibrational effects of a crack are reviewed using simple theoretical models, and detection criteria for horizontal axle machines are defined. These criteria are compared with experimental results obtained using a small scale model and from a real machine. Monitoring techniques developed especially to detect defects of this type in turboalternators are then presented.

21G. Reciprocating Engines

DE82010208 MF **A01**
Cummins Engine Co., Inc., Columbus, IN.
Synfuel Modified Diesel. Quarterly Progress Report, July 1-September 30, 1981.
1981, 24p DOE/ET/15450-T22
Contract AC03-79ET15450
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During the second quarter, Yanmar Diesel Co., Ltd. and Komatsu, Ltd. began baseline testing with standard diesel fuel No. 2 and various blends of SRC-II fuel oil. Yanmar obtained the operating range with their single cylinder prechamber engine on SRC-II. Komatsu obtained the operating range without spark assist on their 4D94 engine. Emissions data (except for particulates), combustion characteristics, startability, optimum injection timing, and cetane improver were obtained on the prechamber diesel engine. The particulate trap is now fabricated and particulate data should be forthcoming next quarter. The Komatsu 4D94 swirl engine will be installed with spark assist next quarter to determine the improvement of spark assisted combustion with SRC-II fuel. Thus far, higher inlet air temperature, high cooling water temperature, higher inlet pressure and fuel blending appear most conducive to successful operation with SRC-II fuel. 100% SRC-II fuel will not operate in the prechamber, swirl chamber, or direct injection diesel in the size tested.

N82-27741/9 PC **A02**/MF **A01**
Atlantis Diesel Engines (Pty) Ltd., Cape Town (South Africa).
Review of Diesel Engine Noise.
M. J. J. Slabber. 1981, 21p
Presented at the Intern. Symp. On Transportation Noise, Pretoria, 21-23 Oct. 1981.

The mechanism of noise generation from diesel engines and associated components and structures is presented. Methods for establishing the main sources of noise and the effectiveness of structural redesign together with the influence of encapsulation are reviewed.

21H. Rocket Motors and Engines

AD-A117 495/2 PC **A03**/MF **A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
The Analysis for Regulation Performance of a Variable Thrust Rocket Engine Control System.
Zhou Xiwen. 29 Jun 82, 27p Rept no. FTD-ID(RS)T-0522-82

No abstract available.

AD-A117 651/0 PC **A10**/MF **A01**
Failure Analysis Associates, Palo Alto, CA.
Probabilistic Environmental Model for Solid Rocket Motor Life Prediction.
Technical publication,
George Derbalian, Jerrell M. Thomas, Paul Johnston, and Gregg Brooks. Mar 82, 222p NWC-TP-6305
Contract N60530-78-C-0127

Temperature changes that solid rocket motors experience while residing in various locations with different climates cause thermal stresses in the propellant. Repeated application of such stresses can cause damage to the rocket propellant, which may result in cracks. This report describes a probabilistic environmental model for solid rocket motors. Movement of rockets from one station to an other is simulated, using a Markov chain technique. A cumulative damage model is used to compile the damage resulting in each rocket location. The rocket external temperature is assumed to be a random variable and expressed in a probabilistic form for each Markov state. As an example, data were collected to represent the environmental model for Sidewinder rockets. The Markov matrix for Sidewinders was based on past motor logistics. Propellant failure is predicted when the cumulative damage exceeds a critical value. (Author)

AD-A117 943/1 PC **E17**/MF **E17**
Johns Hopkins Univ., Laurel, MD. Chemical Propulsion Information Agency.
JANNAF Thirteenth Plume Technology Meeting Held at NASA Lyndon B. Johnson Space Center, Houston, Texas, 27-29 April 1982. Volume I.
Meeting proceeding,
Theodore M. Gilliland. Apr 82, 464p Rept no. CPIA-PUB-357-VOL-1
Contract N00024-81-C-5301

This volume of the proceedings contains the unlimited distribution papers presented at the Joint Army-Navy-NASA-Air-Force (JANNAF) 13th Plume Technology Meeting. Included are papers on flow field property measurement and prediction, electromagnetic interaction, contamination, base flow effects, radiation and gun muzzles flash.

21I. Rocket Propellants

AD-A117 545/4 PC **A02**/MF **A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
Optimal Design of Multiple Tube Grain and their Arrangement,
Zhao Baihua. 29 Jun 82, 24p Rept no. FTD-ID(RS)T-0523-82
Edited trans. of Acta Armamentarii (China) n4 p9-22 1981.

No abstract available.

AD-A117 604/9 PC **A06**/MF **A01**
Ogden Air Logistics Center, Hill AFB, UT. Propellant Analysis Lab.
Surveillance Report. Stage I Dissected Motors. Phase XIII. Propellant and Component Testing.
Semi-annual rept.,
John A. Thompson. May 82, 119p Rept no. MANPA-NR-470(82)
See also AD-A098 409.

Testing was performed to determine the useful shelf/service life for LGM-30 Stage I Rocket Motors. A three year storage program for propellant and components was started in May 1961. This program was then extended to a ten year study and later continued indefinitely to assure that a deterioration in motor physical characteristics could be detected in time to take some corrective actions before the weapon system performance deteriorated below an acceptable level. This report covers only propellant data and limited case bond data. The malfunction of an environmental chamber destroyed component samples that had originally been part of this testing program (and the inadvertent burning of some motors during dissection reduced the material available for testing). Planned dissection of selected motors in the future will provide samples for continued component testing. Test specimens for this reporting period were obtained from motors STM-012, 0012099, and 0012199. UP-7775 block propellant was not tested since that propellant has been used up.

N82-27533/0 PC **A03**/MF **A01**
Nobel's Explosives Co. Ltd., Stevenston (Scotland).
Codification of High Temperature Propellants TRHA.
J. G. K. Higgon. 15 Sep 81, 28p GR-38/80/1, ESA-CR(P)-1374-V-2
Contract ESTEC-4113/79/NL-AKW(SC)

Production of a short grain size TRHA is discussed. Firing tests on GBSe (S5) reference powder indicated that a TRHA grain length of 0.02 mm was needed to match GBSe (S5) ballistics. Since the shortest practical length of TRHA is 0.2 mm, a batch was separated into: regular grain sizes; residue after removal of well shaped grains; and fine dust obtained from the residue. The regular grain size best reproduced the desired ballistics in GR 13/80 tests. Pilot batches of 1.8 mm dia, 0.2 mm length grains were tested as to chemical composition, density, vacuum stability, ignition temperature, mechanical sensitivity, and closed vessel ballistics. Two qualification batches burned too quickly when proofed, due to poor grain cut. Freshly sharpened blades produce a powder to specification.

22.

SPACE TECHNOLOGY

22A. Astronautics

N82-27344/2 PC **A03**/MF **A01**
Grumman Aerospace Corp., Bethpage, NY.
Satellite Services System Analysis Study. Volume 1: Executive Summary.
Final Report.
Aug 81, 42p NASA-CR-167607, NAS 1.26:167607
Contract NAS9-16120

Service requirements are considered. Topics include development of on-orbit operations scenarios, service equipment summary, crew interaction, and satellite features facilitating servicing. Service equipment concepts are considered. Topics include payload deployment, close proximity retrieval, on-orbit servicing, backup/contingency, delivery/retrieval of high energy payloads, Earth return, optional service, and advanced capabilities. Program requirements are assessed.

N82-27345/9 PC **A04**/MF **A01**
Grumman Aerospace Corp., Bethpage, NY.
Satellite Services System Analysis Study. Volume 2: Satellite and Services User Model.
Final Report.
Aug 81, 73p NASA-CR-167608, NAS 1.26:167608
Contract NAS9-16120

Satellite services needs are analyzed. Topics include methodology: a satellite user model; representative servicing scenarios; potential service needs; manned, remote, and automated involvement; and inactive satellites/debris. Satellite and services user model development is considered. Groundrules and assumptions, servicing, events, and sensitivity analysis are included. Selection of references satellites is also discussed.

N82-27346/7 PC **A09**/MF **A01**
Grumman Aerospace Corp., Bethpage, NY.
Satellite Services System Analysis Study. Volume 2A: Satellite and Services User Model, Appendix.
Final Report.
Aug 81, 186p NASA-CR-167609, NAS 1.26:167609
Contract NAS9-16120

A satellite user model and update are presented. Satellite service needs are assessed. Manned, remote, and automatic involvement are also assessed.

N82-27347/5 PC **A07**/MF **A01**
Grumman Aerospace Corp., Bethpage, NY.

Satellite Services System Analysis Study. Volume 3: Service Equipment Requirements.
Final Report.
Aug 81, 140p NASA-CR-167610, NAS 1.26:167610
Contract NAS9-16120

Service equipment mission requirements are discussed. On-orbit operations, satellite classes, and reference missions are included. Service equipment usage and requirements are considered. Equipment identification methodology is discussed. Service equipment usage is analyzed, including initial launch, revisit, Earth return, and orbital storage. A summary of service requirements and equipment is presented, including service equipment status, even interaction, satellite features, and observations.

N82-27348/3 PC **A08**/MF **A01**
Grumman Aerospace Corp., Bethpage, NY.
Satellite Services System Analysis Study. Volume 3A: Service Equipment Requirements, Appendix.
Final Report.
Aug 81, 172p NASA-CR-167611, NAS 1.26:167611
Contract NAS9-16120

Spacecraft descriptions and mission sequences, mission and servicing operations functional analyses, servicing requirements, and servicing equipment are discussed for five reference satellites: the X-ray Timing Explorer, the Upper Atmospheric Research Satellite, the Advanced X-ray Astrophysics Facility, the Earth Gravity Field Survey Mission, and the Orbiting Astronomical Observatory.

N82-27349/1 PC **A06**/MF **A01**
Grumman Aerospace Corp., Bethpage, NY.
Satellite Services System Analysis Study. Volume 4: Service Equipment Concepts.
Final Report.
Aug 81, 112p NASA-CR-167612, NAS 1.26:167612
Contract NAS9-16120

Payload deployment equipment is discussed, including payload separation, retention structures, the remote manipulator system, tilt tables, the payload installation and deployment aid, the handling and positioning aid, and spin tables. Close proximity retrieval, and on-orbit servicing equipment is discussed. Backup and contingency equipment is also discussed. Delivery and retrieval of high-energy payloads are considered. Earth return equipment, the aft flight deck, optional, and advanced equipment are also discussed.

N82-27350/9 PC **A06**/MF **A01**
Grumman Aerospace Corp., Bethpage, NY.
Satellite Services System Analysis Study. Volume 5: Programmatics.
Final Report.
Aug 81, 112p NASA-CR-167613, NAS 1.26:167613
Contract NAS9-16120

The overall program and resources needed for development and operation of a Satellite Services System is reviewed. Program requirements covered system operations through 1993 and were completed in preliminary form. Program requirements were refined based on equipment preliminary design and analysis. Schedules, costs, equipment utilization, and facility/advanced technology requirements were included in the update. Equipment user charges were developed for each piece of equipment and for representative satellite servicing missions.

N82-27358/2 PC **A12**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Large Space Systems/Propulsion Interactions.
Jun 82, 253p E-1286, NAS1.15:82904, NASA-TM-82904
Workshop Held at Cleveland, 22-23 Oct. 1981.

No abstract available.

N82-27687/4 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Comparison of Viscous-Shock-Layer Solutions by Time-Asymptotic and Steady-State Methods.
R. N. Gupta, J. N. Moss, and A. L. Simmonds. May 82, 31p NASA-TM-84479, NAS 1.15:84479
Submitted for Publication.

Two flow-field codes employing the time- and space-marching numerical techniques were evaluated. Both methods were used to analyze the flow field around a massively blown Jupiter entry probe under perfect-gas conditions. In order to obtain a direct point-by-point comparison, the computations were made by using identical grids and turbulence models. For the same degree of accuracy, the space-marching scheme takes much less time as compared to the time-marching method and would appear to provide accurate results for the problems with nonequilibrium chemistry, free from the effect of local differences in time on the final solution which is inherent in time-marching methods. With the time-marching method, however, the solutions are obtainable for the realistic entry probe shapes with massive or uniform surface blowing rates; whereas, with the space-marching technique, it is difficult to obtain converged solutions for such flow conditions. The choice of the numerical method is, therefore, problem dependent. Both methods give equally good results for the cases where results are compared with experimental data.

PB82-252743 PC **A03**/MF **A01**
Indian Space Research Organization, Bangalore.
National Paper of India for the Second United Nations Conference on Exploration and Peaceful Uses of Outer Space (UNISPACE 82).
1982, 50p

The central objective behind India's space program is to put to work space science and technology in aid of the country's developmental efforts. The areas chosen for application are those where satellite - based systems have an inherent edge over conventional, earthbound systems. India's philosophy has been to learn to do things on her own; to try and develop what cannot be obtained and make use of what is available in terms of knowledge, experience, technology after modifying, bending and adapting it to suit her particular, sometimes peculiar, needs. Self-reliance is an important element in this effort. The topics covered in this paper are: State of Space Science and Technology; Applications of Space Science and Technology; An Appraisal of the Program; Looking ahead; International Issues, and International Cooperation and the Role of the United Nations. A glossary is also given.

22B. Spacecraft

AD-A117 404/4 PC **A02**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
13b. Debris and Re-Entry Burnout of Spacecraft,
K. S. W. Champion. 1982, 3p Rept no. AFGL-TR-82-0192
Pub. in Advance Space Research, v2 n3 p121-122 1982.

No abstract available.

AD-A117 546/2 PC **A02**/MF **A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
An Informal Discussion Concerning Geosynchronous Communication Satellites,
Yi Yuanjian. 21 Jun 82, 10p Rept no. FTD-ID(RS)T-0517-82
Edited trans. of Hangkong Zhishi (China) n5 p22-23 1981.

No abstract available.

N82-27234/5 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Assessment of Alternate Thermal Protection Systems for the Space Shuttle Orbiter.
H. N. Kelly, and G. L. Webb. May 82, 13p NASA-TM-84491, NAS 1.15:84491
Presented at the Aiaa/Asme Joint Thermophys. Heat Transfer Fluids and Plasma Conf., St. Louis, 7-11 Jun. 1982.

Candidate concepts are identified. The impact on the Shuttle Orbiter performance life cycle cost, and risk was assessed and technology advances required to bring the selected TPS to operational readiness are defined. The best system is shown to be a hybrid blend of metallic and carbon-carbon TPS concepts. These alternate concepts offer significant improvements in reusability and are mass competitive with the current ceramic tile reusable surface insulation. Programmatic analysis indicates approximately five years are required to bring the concepts to operational readiness.

N82-27342/6 PC **A02**/MF **A01**
Societe Nationale Industrielle Aerospatiale, Les Mureaux (France).
Aerospatiale: Number 1 in Europe Aerospatiale: Numero 1 en Europe.
L. Guillaud. 1981, 6p SNIAS-821-422-103
Text in French. Presented at Coll. Prospace: Sem. D'Echanges Franco-Indiens sur les Tech. De Pointes, Peking and Tokyo, Dec. 1981.

The activities of the company, Aerospatiale, are reviewed. From the days of the Diamant launch vehicle up to the age of Ariane, the company has led the European field in space systems development. Twenty years of international cooperation are recounted. Projects, such as METEOSAT, INTELSAT 5, and TDF-1, are highlighted. Communication satellites are cited as the present goal of R and D.

N82-27351/7 PC **A05**/MF **A01**
Michigan Univ., Ann Arbor.
Longitudinal Control Effectiveness and Entry Dynamics of a Single-Stage-to-Orbit Vehicle.
N. X. Vinh, and C. F. Lin. 1982, 94p NASA-CR-169119, NAS 1.26:169119
Contract NAG1-86

The classical theory of flight dynamics for airplane longitudinal stability and control analysis was extended to the case of a hypervelocity reentry vehicle. This includes the elements inherent in supersonic and hypersonic flight such as the influence of the Mach number on aerodynamic characteristics, and the effect of the reaction control system and aerodynamic controls on the trim condition through a wide range of speed. Phugoid motion and angle of attack oscillation for typical cases of cruising flight, ballistic entry, and glide entry are investigated. In each case, closed form solutions for the variations in altitude, flight path angle, speed and angle of attack are obtained. The solutions explicitly display the influence of different regions design parameters and trajectory variables on the stability of the motion.

N82-27352/5 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Investigation of Cooling Properties of the Gaseous Medium of a Space Station.
S. Baranski, R. Blosznyski, M. Hermaszewski, J. Kubiczkowa, and A. Piorko. Mar 82, 5p NASA-TM-76794, NAS 1.15:76794
Contract NASW-3541
Transl. Into English from Postepy Astronaut. (Poland), V. 12, No. 4, 1979 p 81-84. Original Document Announced as A80-30519. Transl. By Kanner (Leo) Associates, Redwood City, Calif.

An investigation of cooling properties of the gaseous medium was performed in the biosatellite Kosmos-936 as well as in the orbital complexes Soyuz-28/Salyut-6 and Soyuz-30/Salyut-6 with the aid of an especially constructed electric dynamic catathermometer. In this instrument current was measured which was necessary to keep a steady settled temperature of the sensing device. The investigation was performed because of the disturbed heat exhange of the human body caused by lack of natural convection in weightlessness. The instrument also enabled objective estimation of the temperature of the cosmonaut's ody in six optionally selected regions. The results obtained by means of the catathermometer will also enable defining the appropriate hygienic conditions of the gaseous medium of space stations.

N82-27353/3 PC **A10**/MF **A01**
Royal Aircraft Establishment, Farnborough (England). Space Dept.
Study of Strapdown Inertial Optical Systems (SIOS) for Future ESA Spacecraft, Volume 1.
Final Report.
Mar 81, 202p ESA-CR(P)-1549-V-1
Contract ESA-3804/78/NL-JS(SC)
Prepared in cooperation with British Aerospace Dynamics Group, Bristol, England.

A baseline (Kalman filter) SIOS, consisting of a set of high performance gyros, two or more star mappers and an onboard processor, is described. Centralized and modular data processing are considered. Control systems are specified and the performance of the attitude measurement and control system, using a Kalman filter, is simulated for low orbit Earth pointing cases and for a celestial target mission. Geostationary

mission studies assumed the use of a simple constant gain filter and RF sensor, although results with the baseline system are included. The former approach is adequate, but the autonomy of optical systems is attractive. Kalman filter system performance is impressive for an Earth pointing satellite, and the whole system is immune to high noise levels, but geometrical misalignments limit absolute pointing accuracy. Analysis reveals doubt as to whether the Kalman filter is necessary, although its inclusion is not difficult.

N82-27354/1 PC **A09**/MF **A01**
Royal Aircraft Establishment, Farnborough (England). Space Dept.
Study of Strapdown Inertial Optical Systems (SIOS) for Future ESA Spacecraft, Volume 2.
Final Report.
Mar 81, 189p ESA-CR(P)-1549-V-2
Contract ESA-3804/78/NL-JS(SC)
Prepared in cooperation with British Aerospace Dynamics Group, Bristol, England.

A baseline (Kalman filter) SIOS, consisting of a set of high performance gyros, two or more star mappers and an onboard processor, is described. Centralized and modular data processing are considered. Control systems are specified and the performance of the attitude measurement and control system, using a Kalman filter, is simulated for low orbit Earth pointing cases and for a celestial target mission. Geostationary missions studies assumed the use of a simple constant gain filter and RF sensor, although results with the baseline system are included. The former approach is adequate, but the autonomy of optical systems is attractive. Kalman filter system performance is impressive for an Earth pointing satellite, and the whole system is immune to high noise levels, but geometrical misalignments limit absolute pointing accuracy. Analysis reveals doubt as to whether the Kalman filter is necessary, although its inclusion is not difficult.

N82-27355/8 PC **A11**/MF **A01**
Giessen Univ. (Germany, F.R.). Physikalisches Inst.
Ground Tests on the Possibility of Controlling Spacecraft Charging Phenomena Via Electric Propulsion.
Final Report.
K. Bescherer, K. H. Groh, and N. K. Nikolaizig. Dec 81, 227p ESA-CR(P)-1550
Contract ESA-3639/78/NL-AK

Literature on spacecraft - environment interaction was reviewed; arc discharging of spacecraft in substorm plasma was simulated. The literature shows that geosynchronous satellites can be charged up to thousands of volts. Arc discharging was studied by exposing Teflon, Kapton, Chemglaze, and Nextel samples to electron irradiation, with the RIT 10 ion propulsion system operating or not operating. Charging is controlled by operating the RIT 10 and/or its neutralizer near the samples. Surface potential can be limited to a few hundred volts.

N82-27356/6 PC **A02**/MF **A01**
Societe Nationale Industrielle Aerospatiale, Les Mureaux (France).
Spaceborne Subsystems and Equipment Developed by the Ballistic and Space Systems Division les Sous-Systemes et Equipements Spatiaux Developpes Par la Division Systemes Balistiques et Spatiaux de l'Aerospatiale.
L. Guillaud. 1981, 7p SNIAS-821-422-104
Text in French. Presented at Coll. Prospace: Sem. D'Echanges Franco-Indiens sur les Tech. De Pointes, Peking and Tokyo, Dec. 1981.

Hardware developed for such projects as Ariane, Syphonie, METEOSAT, INTELSAT, ARABSAT, TDF-1/TV-Sat, SPOT and others are described including satellite structures such as booms, frames, antennas. Thermal control methods are outlined. Solar generators are covered. Attitude control and pyrotechnics are also discussed.

N82-27751/8 PC **A02**/MF **A01**
Societe Nationale Industrielle Aerospatiale, Les Mureaux (France).
Magnetic Suspension and Flywheels: Spaceborne and Terrestrial Applications la Suspension Magnetique et les Volants d'Inertie: Applications Spatiaux et Terrestres.
P. C. Poubeau. 1981, 4p SNIAS-821-422-111
Text in French. Presented at Conf. Aerospatiale a la Journee sur l'Espace et Son Futur, Toulouse, Oct. 1981 Sponsored by Sitef.

Satellite attitude control, using inertia wheels, is discussed. Elimination of friction effects through application of magnetic bearings is considered. The inertia wheel/magnetic bearing configuration can also be used to store kinetic energy. Higher rotational velocities create a need for stronger rotor construction materials; improved mechanical properties can be achieved with composite materials. Kinetic energy storage for earthside applications (solar energy storage; electric vehicles) is mentioned.

N82-27993/6 PC **A03**/MF **A01**
National Physical Research Lab., Pretoria (South Africa). Optical Sciences Div.
A System for the Preliminary Processing of NOAA Polar Orbiter Data with Level 1B, Local Area Coverage (LAC) Format.
M. Lasserre. Jun 81, 47p CSIR-SR-FIS-255

A system of programs to translate and rewrite, in 8 bit accuracy, the 10 bit NOAA LAC TIROS satellite data tapes is presented. Three assembler programs are used to give data quality statistics, 10 bit pixel value histograms, and Earth location, calibration and zenith angle files. A fourth program interfaces with a user defined FORTRAN subroutine for calibration processing directly from 10 bit pixel data.

22C. Spacecraft Trajectories and Reentry

AD-A117 641/1 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Equatorial Motion About an Oblate Primary.
Technical rept.,
Laurence G. Taff. 1 Jun 82, 30p TR-610, ESD-TR-82-050
Contract F19628-80-C-0002

This Report discusses motion in the equatorial plane of an oblate primary. Included are terms due to nonsphericity through J sub 2 in the potential. This problem is exactly soluble in the same sense that the ordinary two-body problem is exactly soluble. The full solution is given, the connection with perturbation theory (as J sub 2 yields 0) is demonstrated, and the stability of circular orbits is discussed. The analytical solution involves all three incomplete elliptic integrals which limits its transparency.

22D. Spacecraft Launch Vehicles and Ground Support

N82-27328/5 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Autonomous Antenna Tracking System for Mobile Symphonie Ground Stations.
K. Ernsberger, G. Lorch, and E. Waffenschmidt. Mar 82, 13p NASA-TM-76649, NAS 1.15:76649
Contract NASW-3541
Transl. Into English from Symphonie Symp., Centre National d'Etudes Spatiales, Toulouse and Deutsche Forschungs und Versuchsanstalt fuer Luft und Raumfahrt, Cologne, 1980. Original Language Document Announced as N81-23142. Transl. By Kanner (Leo) Associates, Redwood City, Calif. Symp. Held in Berlin, 4-7 Feb. 1980 p 541-552.

The implementation of a satellite tracking and antenna control system is described. Due to the loss of inclination control for the symphonie satellites, it became necessary to equip the parabolic antennas of the mobile Symphonie ground station with tracking facilities. For the relatively low required tracking accuracy of 0.5 dB, a low cost, step track system was selected. The step track system developed for this purpose and tested over a long period of time in 7 ground stations is based on a search step method with subsequent parabola interpolation. As compared with the real search step method, the system has the advantage of a higher pointing angle resolution, and thus a higher tracking accuracy. When the pilot signal has been switched off for a long period of time, as for instance after the eclipse, the antenna is repointed towards the satellite by an automatically initiated spiral search scan. The function and design of the tracking system are detailed, while easy handling and tracking results.

N82-27343/4 PC **A02**/MF **A01**
Societe Nationale Industrielle Aerospatiale, Les Mureaux (France).
The Ariane Launch Vehicle and Automation le Lanceur Ariane et l'Automatique.
H. P. Nguyen. 1981, 18p SNIAS-821-422-106
Text in French. Presented at Afcet Congr. Automatique 1981, Nantes, France, 27-29 Oct. 1981.

The automated command and guidance systems on board the Ariane launch vehicle are presented. The functions of the various automatic systems are summarized. Mathematical modeling is explained in terms of control theory. The development of these systems, in particular the guidance and piloting control loops, is reviewed. Hybrid simulation and model tests (wind tunnel; shaker; water tunnel) are considered. Results provide insight into problems of interface.

KEYWORD INDEX

NTIS®

Index entries in this section are selected to indicate important ideas and concepts presented in a report. When using the keyword index, be sure to look under terms narrower, broader, or related to a particular topic. Although some of the keywords are not selected from a controlled vocabulary of terms, most of them have been selected from the DoD, DoE, NASA, or NTIS controlled vocabularies. The entries are arranged by keyword and then by the NTIS order number.

SAMPLE ENTRY

FAST FOURIER TRANSFORMATIONS
Computation of Hankel Transforms Using the Fast-Fourier Transform Algorithm.
PB80-104045 33

Keyword term
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NTIS order number Page number

ABLATION
A Semi-Analytical Model for Laser-Induced Ablation of Fibre-Resin Composites,
AD-A117 697/3 5059

ABSORBERS (MATERIALS)
A New Type of EM Wave Absorbing Coating.
AD-A117 472/1 5058

ABSORPTION
Compressibility of Colloids: I. Compressibility Studies of Aqueous Solutions of Amphiphilic Polymers and Their Adsorbed State on Polystyrne Latex Dispersions by Ultrasonic Velocity Measurements.
AD-A117 416/8 5064

ABSORPTION COEFFICIENTS
Parameters for Ozone Photolysis as a Function of Temperature at 280-330 nm. Revision.
AD-A117 502/5 5025

ABSORPTION HEAT
Utilization of Waste Heat by Absorption Processes.
DE82900731 5073

ABSORPTION SPECTRA
The Stress Dependence of Adsorption.
AD-A117 635/3 5026

ABSTRACTS
Walter Reed Army Institute of Research Annual Progress Report, Fiscal Year 1981.
AD-A117 411/9 5010

Research and Development Services: Methods Development. Appendices.
AD-A117 644/5 4994

ACADEMIC LIBRARIES
Introducing the College-Bound Student to the Academic Library: A Case Study,
ED-200 236 4996

ACCELERATORS
ATA Diagnostic Beam Dump Conceptual Design.
DE82012047 5122

ACCELEROMETERS
Fluidic Force Transducer.
PATENT-4 326 559 5088

Accelerometers. 1970-August, 1982 (Citations from the NTIS Data Base).
PB82-873274 5096

ACCIDENT INVESTIGATIONS
Special Investigation Reports.
PB82-917000 5091

Special Investigation Report - Accidents Involving Passengers between Coupled Cars on the New York City Transit Authority.
PB82-917002 5091

ACCIDENTS
Cause Relationships of Collisions and Groundings Project Results and Conclusions,
AD-A117 535/5 5091

Cause Relationships of Collisions and Groundings - Research Project Conclusions,
AD-A117 536/3 5090

Railroad Accident Reports - Brief Format, Issue Number 2, 1980.
PB82-916903 5091

ACEE PROGRAM
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N82-27280/8 4985

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DE82901165 5030

ACETYLENE
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AD-A117 684/1 5056

ACID ELECTROLYTE FUEL CELLS
Catalyst and Process Development for Hydrogen Preparation from Future Fuel-Cell Feedstocks. Final Report, October 1, 1978-June 30, 1981.
DE82007966 5053

Cell-Module and Fuel-Conditioner Development. 9TH Quarterly Report, October-December 1981.
DE82012863 5055

ACID MINE DRAINAGE
Sludge Disposal from Acid Mine Drainage Treatment.
PB82-257148 5083

ACID RAIN
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DE82013309 5076

ACOUSTIC DELAY LINES
A SAW Tapped Delay Line with Short (15-ns) Pedestal of Delay and High (> 110 dB) Feedthrough Isolation.
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ACOUSTIC DETECTION
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ACOUSTIC DETECTORS
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PB82-262536 5138

ACOUSTIC EMISSIONS
A Spectrum Analyser for Acoustic Emission.
AD-A117 720/3 5094

ACOUSTIC FILTERS
A SAW Tapped Delay Line with Short (15-ns) Pedestal of Delay and High (> 110 dB) Feedthrough Isolation.
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ACOUSTIC INSULATION
A Study of Soundproofing Requirements for Residences Adjacent to Commercial Airports.
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ACOUSTIC MEASUREMENT
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ACOUSTIC SCATTERING
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Compressibility of Colloids: I. Compressibility Studies of Aqueous Solutions of Amphiphilic Polymers and Their Adsorbed State on Polystyrne Latex Dispersions by Ultrasonic Velocity Measurements.
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ACOUSTIC WAVES
Studies of the Propagation of Elastic Waves in Fluids and Solids.
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AD-A117 418/4 5091

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The Use of Prototypes in Weapon System Development.
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PB82-252222 5085

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N82-27353/3 5141

Study of Strapdown Inertial Optical Systems (SIOS) for Future ESA Spacecraft, Volume 2.
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N82-27488/7 5057

Fast-Setting Phenolic and Tannin-Based Honeymoon Adhesive Systems for Exterior Grade Glued Laminated Timber.
N82-27489/5 5057

Self-Shoring Adhesive System.
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Fast-Setting Phenolic and Tannin-Based Honeymoon Adhesive Systems for Exterior Grade Glued Laminated Timber.
N82-27489/5 5057

Minimum Curing Temperature of Cold-Setting and Fast-Setting Honeymoon Laminating Adhesives.
N82-27490/3 5057

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N82-27492/9 5057

Elastomer Toughened Polyimide Adhesives.
PAT-APPL-6-308 201 5057

Self-Shoring Adhesive System.
PAT-APPL-6-314 334 5058

Wax Based Adhesives for Paper. 1972-August, 1982 (Citations from the Institute of Paper Chemistry Data Base).
PB82-873118 5058

ADJOINTS
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Polynomial Systems as Adjoint Process Machines.
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ADSORBENTS
Evaluation of Solid Sorbents for Sampling and Analysis of Explosives from Water.
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The Use of Prototypes in Weapon System Development.
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Timber Typing on National Forest Lands with High Altitude Large Format Photography.
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Wind-Tunnel Measurements of Aerodynamic Forces and Moments on a Model of a Semi-Submersible Offshore Drilling Rig.
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Time-Averaged Aerodynamic Forces and Moments on a Model of a Two-Legged Concrete Offshore Platform.
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AERODYNAMIC LOADS
Performance Deterioration Due to Acceptance Testing and Flight Loads; JT9D Jet Engine Diagnostic Program.
N82-27309/5 5139

AERODYNAMIC NOISE
Airbus Industrie and Community Noise.
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AERODYNAMIC STABILITY
Longitudinal Control Effectiveness and Entry Dynamics of a Single-Stage-to-Orbit Vehicle.
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Agard Three-Dimensional Aeroelastic Configurations.
N82-27232/9 4982

AERONAUTICAL ENGINEERING
Acta Aeronautica et Astronautica Sinica. Volume 2, Number 3--Translation.
AD-A117 465/5 4983

AEROSOLS
The Phoretic Motion Experiment (PME) Definition Phase.
N82-27329/3 5095

AEROSPACE ENGINEERING
Spaceborne Subsystems and Equipment Developed by the Ballistic and Space Systems Division les Sous-Systemes et Equipements Spatiaux Developpes Par la Division Systemes Balistiques et Spatiaux de l'Aerospatiale.
N82-27356/6 5142

National Paper of India for the Second United Nations Conference on Exploration and Peaceful Uses of Outer Space (UNISPACE 82).
PB82-252743 5141

AEROSPACE INDUSTRY
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N82-27342/6 5141

AEROSPACE MEDICINE
Biodynamic Data Bank Feasibility Study.
AD-A117 921/7 5021

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Livestock and Meat Marketing in West Africa. Volume I: Synthesis Upper Volta.
PB82-252826 4988

AGGLOMERATION
Fundamentals of Fluidization of Sticky Particles.
PB82-262551 5135

Agglomeration and Briquetting of Ores and Feeds in Iron and Steel Making. 1966-August, 1982 (Citations from the Metals Abstracts Data Base).
PB82-873498 5038

AGGREGATES
Report on the Suitability of Some Metallurgical Slags as Aggregate for Concrete.
N82-27537/1 5084

AGING (BIOLOGY)
Age Related Factors Which May Predispose to Carcinogenesis.
PB82-922902 5014

AGRICULTURAL CHEMISTRY
Indian Agriculture Research Institute. Division of Soil Science and Agricultural Chemistry: Activities and Achievements.
PB82-252735 5040

AGRICULTURAL ECONOMICS
Rice Production in Nepal: Factors Affecting Adoption of Modern Varieties and Their Effect on Income and Income Distribution.
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Economic and Physical Impacts on Individual Farm Management Units Under Alternative Management Scenarios in the Blue Creek Watershed, Pike County, Illinois.
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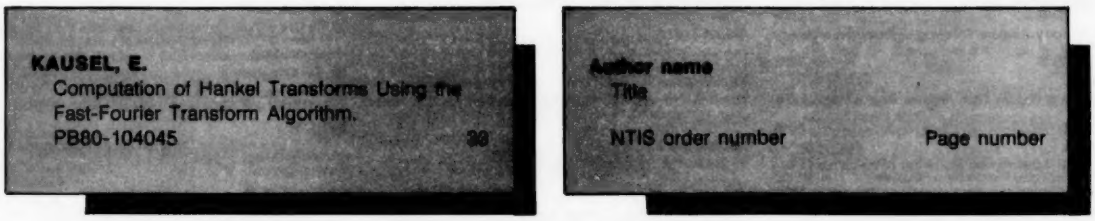

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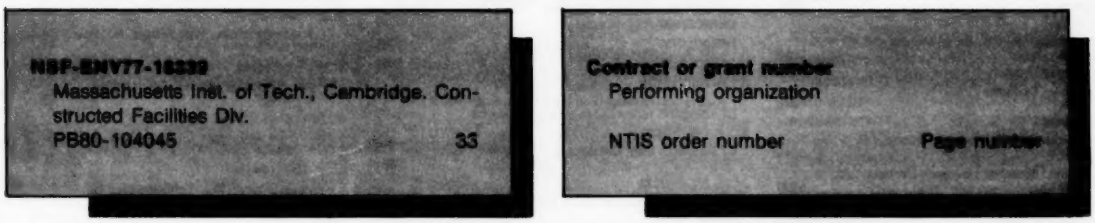

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Columbia Radiation Lab. New York.
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Georgetown Univ., Washington, DC. Dept. of Physics.
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Oklahoma Univ., Norman. School of Aerospace, Mechanical and Nuclear Engineering.
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Indiana Univ. at Bloomington. Dept. of Chemistry.
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Pittsburgh Univ., PA. Learning Research and Development Center.
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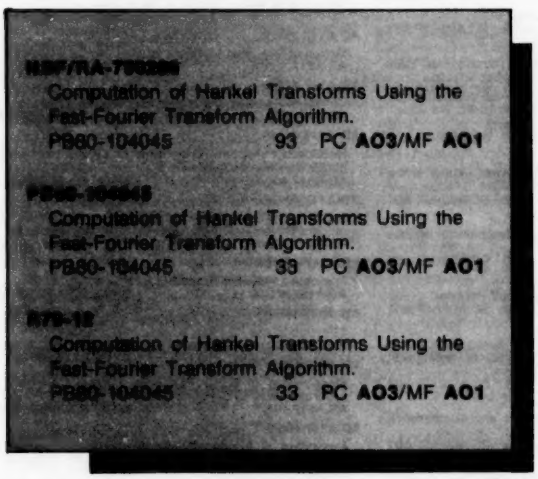
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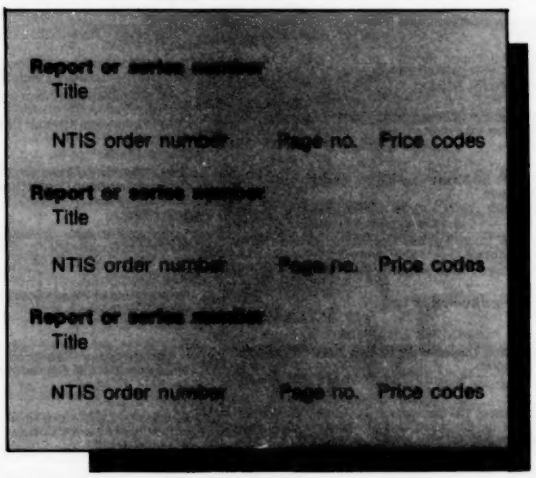
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PATENT-4 316 201 5040 Not available NTIS

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